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AUTHOR	Crawford, Caroline M., Ed.
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ABSTRACT

This document contains the papers on graduate and inservice education from the SITE (Society for Information Technology & Teacher Education) 2002 conference. Topics covered include: Geographic Information Systems in teacher education; re-certification and accreditation; construction of a Web site by graduate teacher education students; Web-based professional development forum to enhance teacher education; building an educational technology masters degree program with ISTE/NCATE standards; the Learning Schools Programme (United Kingdom); Web-based guidance system for the living technology teacher; using technology to engage and empower students outside of the classroom; developing effective teaching skills through instructional technologies; university-schools collaboration in the appropriate use of information communication technologies; Web-based multimedia for educators course; Utah state-wide professional development model; integrating inquiry-based learning into project-based methodology using a constructivist approach; composite picture of the state of computer use and teacher training; Canada-wide Francophone network of teaching expertise; helping inservice teachers facilitate the use of information technology during preservice teacher field experiences; e-supervision of graduate students using videoconferencing; knowledge creation strategies in teacher education; technology in the children's literature course; use of instructional technologies in enhancing effective teaching skills; triadic collaboration--a three-sided approach to technology integration; the Portuguese Information Society; WebQuests for course delivery and integration training; Web-based conferencing to promote interactivity and collaboration in teacher preparation; information technology education for teachers in Hong Kong; hybrid courses; exploding barriers and obstacles to language learning; using moral development theory to teach K-12 cyber-ethics; learning environments in adult teacher education; effectiveness of types of learner interactivity in an online professional development course; evaluation of a Goals 2000 faculty development project; graduate instruction combining online, on-site, and face-to-face; professional development CD-ROM for dealing with disruptive pupils; technology innovation challenge grant lessons learned; establishing graduate cohorts for inservice teachers in rural

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regions; Project MITTS (Master Instructional Technology TeacherS); using online sessions in traditional face-to-face graduate education classes; computer camp for teachers; using a resource-based learning environment to foster self-directed learning in inservice teachers; technology use in case-based teacher education; formative evaluation of an online master's program; PalmOS handheld computers and standards, assessment, and accountability; incorporating cognitive learning theory and instructional design models in graduate-level multimedia development courses; integrated constructionist model for meaningful online learning; writing scenarios for learning to teach with technology; ChalkTalk OnLine; and learning to teach for understanding in a technology-mediated professional development environment. Several brief summaries of conference presentations are also included. Most papers contain references. (MES)

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Graduate and Inservice Education (SITE 2002 Section)

Caroline M. Crawford. Ed.

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SECTION EDITOR:
Caroline M. Crawford, University of Houston-Clear Lake

The appropriate and successful integration of technology into today's diverse learning environments remain a predominant theme of importance within the areas of graduate and inservice education. Research focused upon face-to-face, Internet-enhanced and Internet-based learning environments has expanded imperative theoretical, research-related and application-based discussions. The appropriate and successful integration of technology within the learning environment is the focus of the majority of outstanding articles within this section. The authors within this section offer the latest research and theoretical issues through which the future of face-to-face and distributed learning environments will emerge.

Professional development is a growing area of interest within the world of instructional technology. The integration of technology into the learning environments over the previous ten year period has left a significant gap between the amount of technology available and the support for teacher candidates and inservice educators towards appropriately and successfully integration technology into the learning environment. As such, a renewed interest in and focus upon professional development is occurring within the world of graduate and inservice education. Emphases upon managing change, action research, integrating technology into the teacher candidate and inservice educator's learning environments, as well as Internet-enhanced and Internet-based professional development opportunities are discussions emerging as predominant themes.

Learning environment instruction is a vital element within graduate and inservice education, with the essential aspects focusing upon learning environments, learner-centered and instructor-centered instruction, collaborative technology integration into learning environments, interactive activities, project based instruction, content-based instruction and case study-based instructional environments. Learning environments emphasizing the latest research and theoretical issues pertaining to face-to-face, Internet-enhanced and Internet-based instruction are in its infancy. As well, the integration of technologically focused enhancements for the learning environment is accentuated. Instruction pertaining to scaffolding of knowledge, multimedia resources, instructional design and development, and the integration of moral development theory maintain interest; further, a triadic collaboration that enhances instruction through technological integration is discussed. Interactive activities associated with Web-based conferencing, videoconferencing, francophone networks, and other related information communication technologies are discussed with opportunities to communicate points of interest. Finally project-based, content-based and case study-based teacher education and graduate level learning environments are highlighted.

Student-centered learning environments focus upon engaging students outside the classroom environment, multimedia and handheld technologies. Engaging students within real-world environments, outside of the four walls of a classroom environment, offers innovative aspects towards enhancing learning objectives. Multimedia learning environments enhance the student-centered opportunities towards further understanding, with emphases upon linear and nonlinear multimedia programs; further, cognitive learning theory and instructional design models are appropriately incorporated and presented as aspects of the design and development process. Lastly, handheld technologies have become elements of interest, as standards, assessment and accountability are presented as prevailing movements within the learning environment.

Teacher candidate instruction is a continual area of focus within instructional technology. As such, focusing upon developing master instructional technology educators within graduate and inservice learning environments. One project that emphasizes the development of master instructional technologists is Project MITTS (Developing Master Instructional Technology TeacherS) that focuses upon technology-rich field experiences as well as professional development opportunities that emphasize standards, best practices, mentoring and the utilization of technology. A second project is

one that emphasizes the partnership between institutions of higher education, surrounding school districts, public libraries, hardware manufacturers, software designers and manufacturers, local community organizations and telecommunication companies. Each of the organizations associated with the partnership emphasize a systemic educational reform through professional development opportunities.

Certification, accreditation, evaluation and levels of competency are areas of continual concern. The importance of national accreditation and certification standards towards the appropriate and evolutionary evaluation of teacher preparatory units and instructional technology programs emphasize a continual formative progression towards appropriate and successful level of expertise expected so as to enhance the preparation of teacher candidates and further enhancing the standards of inservice educators. Instructional technology competencies of graduate-level teacher candidates, graduate students and inservice educators offer elements of expertise and reflect the encouragement and promotion of information technology through the development of portfolios as a reflection of information technology competency.

Graduate and inservice education theoretical discussions and research that impact the learning environment are imperative to the ever-expanding conceptual framework. Pertinent theoretical issues surrounding graduate level, teacher candidate educational opportunities and inservice teacher professional development must be carefully considered and are imperative as technologies become more available and viable within learning environments. The authors within this section have presented rigorous research, contemplative theoretical discussions and thoughtful reflections that exemplify the cutting edge of the world of instructional technology.

Caroline M. Crawford is an Assistant Professor of Instructional Technology at the University of Houston-Clear Lake. She can be reached at crawford@cl.uh.edu.

GIS in Teacher Education: Notes from the Field II

Marsha Alibrandi
Shannon White
Rita Hagevik
Barbaree Ash Duke

Over three years of an experimental course entitled GIS in Education, we have consistently engaged student participants as collaborative co-constructive partners in designing instruction. With a class website that facilitates communication between students and instructors, and by incorporating former students as instructors, a number of new components have been added. With a goal of sustained GIS integration, we have conducted follow-up studies of in-service Instructional technology teachers' use of GIS across the curriculum. GIS projects designed by the participants and the results of follow-up studies are presented.

In an experimental course offered to M.Ed. candidates in Instructional Technology, course design, the design of the course itself is coconstructed with student participants. Given the uniqueness of a GIS in Education course, there is opportunity to discuss with students the value, placement and design of such a course as part of their Instructional Technology experience.

Through web and email feedback, reflections, discussions and quizzes, students have provided useful insights into their learning and how a course of this kind can best meet teachers' needs. Aduet and Paris and Audet have both discussed the proplonged period between teacher introduction to GIS and its implementation. In various studies, we have investigated what factors contribute to what we have called GIS 'uptake.'

Working with prior students to understand what helped them most to learn toward implementing those suggestions in future iterations, we found that the addition of a virtual lab component, books that discuss GIS use in both communities and schools, and a community partnership component were all contributing factors to learning and using GIS in concert with existing curricula. In the state of North Carolina where high stakes testing has greatly impacted classroom teacher practice, the integration of technology must meet curricular goals.

Elementary, Middle and High school teachers all found applications across a wide range of curricula. Of a dozen graduate teacher education projects, there were three main subject areas: Social Studies, Language Arts, Business Education and Earth Science or Geology See Table 1.). Additional projects by other students were not related to K12 curriculum, but to other issues.

With a goal of both temporal and curricular 'uptake,' we promote a methodology of cllaboration At least two of the teachers integrated interdisciplinary curricula with GIS. The Techno-book project was based in the language Arts curriculum of student reading "journey books" that tell the stories of journeys. The Instructional Technology specialist

designed a project in shich students would map the journey using a GIS (ArcVoyager), would relate historic, weather and economic information to provide context for the story, and would present these in a Power Point presentation.

Elementary	Middle School	High School
Town History (4th grade	Techno-Book project	Business Education: Site Location
Town History	Civil War History: Troop Movement	Barrier Beach Erosion Modeling
County-wide SPED Resources	Geographic Regions of North Carolina	Voter Redistricting in North Carolina
	Historic Slave Population Demographics	Historic Population Change in the South
		Business Education: Locating a new GAP store

With Instructional Technology specialists central and working across disciplines, we hope to see increased lateral 'uptake,' that is, uptake of GIS by teachers other than the initial GIS user. In subsequent meetings of Instructional Technology specialists, presentations on GIS are planned to develop interest and support of GIS integration.

Among international GIS educators, there was debate about the location of GIS in the curriculum; whether geography, the natural sciences or instructional technology were the most appropriate home bases for school GIS. It has been our assumption (with inadequate evidence to project) that uptake in Instructional Technology might result in more lateral uptake across disciplines. One issue involved in the lateral adoption of GIS is that when one person concentrates his or her energy on GIS without reaching out to collaborate across disciplines, that GIS could essentially be lost to an entire school population if that one teacher moves or retires. Our assumption is also that instructional technology specialists can more easily integrate any technology across disciplines, so that GIS would simply be one more of those technological skill sets that could be transferred from one discipline to another, thus enhancing transfer learning.

As the course continues and if teachers tend to avail themselves of in service GIS opportunities, we will investigate these possible expansions of school GIS application. By SITE 2002, we will have additional data to report regarding integration by schools who have participate din various GIS offerings.

Professional Development Kit (PDK): Multimedia Resources for Instructional Decision Making

by Kelly Hunter Limeul and Janet Smith
National Center on Adult Literacy
University of Pennsylvania/Graduate School of Education
3910 Chestnut Street
Philadelphia, PA 19104-3111

The Professional Development Kit (PDK) is a multimedia resource for adult educators that utilizes print, video, CD-ROM, and the depth, flexibility, and complexity of the web.

The CD-ROM contains over 10 hours of Quicktime™ video that is accessed from within the computer's CD-ROM drive as one navigates through the different organizational elements of the PDK web site. The videos are also available on conventional VHS tape for viewing in group or classroom settings. Within the 10 hours of footage are authentic classroom investigations centered around particular topics, as well as commentary from professionals working within the field of adult literacy. The centerpiece of the kit is the PDK Guide, which provides ideas and resources of how to use the accompanying CD-ROM and videotapes in the professional development of adult educators.

The submitted video "Margarita: Narrative" follows an ESL teacher as she attempts to engage students in reading, writing, speaking and listening through the use of a dialogue exercise. The taping took place over a two week period in an authentic high functioning ESL classroom in Bethlehem, PA. The final 15-minute piece was culled from over 15 hours of raw footage.

The Maze of Re-Certification and Accreditation

Frances K. Bailie, Ph.D.
Department of Computer Science
Iona College
United States
fbailie@iona.edu

Catherine M. Ricardo, Ph.D.
Department of Computer Science
Iona College
United States
cricardo@iona.edu

Abstract: Education in America is currently receiving prominent attention in the public forum. Efforts to strengthen the quality of education have included more rigorous student and teacher standards, creating the necessity for reforms and revisions in teacher preparation programs. This paper describes the process involved in applying for New York State Re-Certification and NCATE Accreditation of a Masters Program in Educational Technology. The focus is on the challenges that a small college faces in complying with the requirements of various organizations. Problems, solutions and a sample curriculum are provided.

Introduction

One of the goals of the Goals 2000 legislation passed in 1994 was to provide teachers with opportunities for lifelong enhancement of professional skills. As a nation, we have fallen short of this goal (Senate Committee on Labor and Human Resources 1998). The turn of the century has witnessed a renewed interest in the state of education in America, as evidenced by its prominence in the 2000 presidential election. Parents are concerned about the quality of education their children are receiving. Our nation's leaders are calling for accountability as they seek to close the gap between our system of education and that of other industrial nations around the world. Concern appears to be focused on the lack of competent teachers, laying the problem directly at the feet of teacher preparation programs. One response has been the establishment of stricter standards. But the solution begins with the consideration of the students' needs and growth. Once we establish what our students need to know and be able to do, we can develop programs to prepare teachers to meet student objectives. Teacher standards must flow from student standards. However, setting standards is only the first step; of far greater importance is developing assessments to meet the standards (Galluzzo 1999). Almost every state has released more rigorous learning standards for students. Since research has shown that teacher expertise is related to student achievement (Darling-Hammond 1997), we must now focus our attention on teachers and the programs that prepare them. States are rethinking their certification procedures as well as their policy of requiring accreditation of teacher preparation programs, thus putting organizations like the National Council for Accreditation of Teacher Education (NCATE) in the foreground of the educational reform dialogue.

Iona College's MS Program in Educational Technology

Iona College has offered a graduate program in computer technology in education since 1983, when the College's MS program in Education Computing became the first of its kind to be approved by the New York State Department of Education. The program was offered at both the main campus in New Rochelle and the branch campus in Rockland County. It was designed for teachers, administrators and

other school personnel, whether they were computer novices or experienced computer users. The goals were to enable them to provide leadership in the field for schools and industry, to integrate educational computing into the school curriculum, to be teachers of computer literacy, to write educational software, and to conduct research and evaluation in the field. Because the program was placed within the Department of Computer Science rather than the Department of Education, there was a strong technical computing orientation that included programming. Students who completed the MS program were eligible for permanent certification in elementary education and the secondary subject areas, provided they met the other state requirements. The degree was considered by the state to be "functionally related" to all these certification areas.

As originally offered in 1983, the program had a common core of 9 credits, three areas of specialization (Elementary Education, Secondary Education, and Educational Software Design), each with 12 specialization core credits. The specializations required programming in an appropriate language: LOGO for elementary education, BASIC for secondary education, and a commercial language for software design. There were 9 credits in general electives, and 6 credits in a culminating experience (thesis or project). When the program was revised in 1991, the goals remained the same but the specializations were eliminated. The core was changed to 15 credits, with 15 credits in general electives and 6 credits in a culminating experience.

Because of changes in the undergraduate preparation of teacher candidates, the Department of Computer Science undertook a major revision of the program in 1998. As the College was educating the community about its mission statement, the department identified the mission of the program: To provide students with the knowledge, skills, and experiences to become successful practitioners and leaders in the field of Educational Technology. At that time we changed the name of the program to MS in Educational Technology. The student population was identified as teachers, administrators, corporate trainers, and others who wish to enhance their knowledge of emerging educational technologies. The program remained open to both computer novices and experienced computer users. Linked to the mission of the College and the department, the program goals were defined to enable graduates to: provide leadership in Educational Technology for schools and industry; participate in the integration of Educational Technology in the learning environment; conduct research and evaluation in the field of Educational Technology; develop a foundation for continuing education and growth in the field of Educational Technology.

The curriculum changes included adapting an existing course, Introduction to Software Packages for Education, as a transition course that would not count towards the degree. The core consisted of 12 credits, with 18 elective credits, and a 6 credit capstone in research methods and a research project. The department committee's proposal was approved by the department and the college committees and was sent to the State Education Department, where it was also approved and went into effect in September of 1999.

New York State Certification Requirements

In 1996, after New York State adopted new performance-based student learning standards, the Regents Task Force on Teaching was established to address the teaching crisis in the State. They found that too few teachers are prepared to incorporate the more rigorous student standards and assessments and that too few teachers are able to sustain a high level of standards throughout their career (Teaching to Higher Standards: New York's Commitment 1998). The findings of this task force led to immediate action by the State. In September 1999, the Deputy Commissioner for Higher Education in the State of New York sent a letter to institutions offering teacher education programs stating that the Board of Regents had adopted new standards for teacher preparation programs. Among the objectives of these new standards are to ensure that: teachers would receive rigorous preparation in the content areas they would teach; these new teacher standards would coincide with the performance-based student learning standards that had been adopted in 1996; teachers would have experiences with diverse student populations; education faculty would collaborate with faculty in the arts and sciences, local schools, parent and community groups.

Seeking New York State Certification

The State also issued revised methods of obtaining both Initial and Professional Certification for teachers. When Iona received notification of these changes, the first decision we faced was whether to revise our program to offer Initial or Professional Certification. Since Initial Certification had traditionally been the province of baccalaureate programs, it seemed appropriate to offer our students the opportunity to attain Professional Certification. The State described numerous ways to achieve Professional Certification but those we considered were: 1) A Masters degree plus 12 graduate credits in a candidate's undergraduate major and 2) A Masters degree that includes 12 graduate credits linking pedagogy and content in English Language Arts, Mathematics, Science and Technology, and Social Studies. We rejected the first option because the completion of at least 40 graduate credits appeared to place too great a burden on students. We decided on option two because we believed it would better meet the needs of our student body. While Iona already had courses that addressed the linking of pedagogy and content, none did so explicitly in each of the three areas. Therefore, this decision necessitated the development of three new courses to replace some of our current courses.

These courses were designed to enhance the teaching of these three content areas utilizing the most current and appropriate software. The new courses were entitled Integrating Technology into the English Language Arts Curriculum, the Mathematics, Science and Technology Curriculum, and the Social Studies Curriculum. The courses emphasized the creation and delivery of a variety of lessons to afford the students practical experiences using software most appropriate to the specific content areas (e.g., desktop publishing, spreadsheets, database management systems). Faculty members from the Departments of English, Mathematics, Biology, and History at Iona provided guidance and suggestions to ensure the required linkage of content and pedagogy. These courses accounted for 9 of the 12 credits needed. The final 3 credits were accommodated through an existing course where students engaged in an independent research project involving the integration of technology in the classroom.

Once the curriculum had been revised, the next step was to complete the New York State application for certification, which placed a strong emphasis on the preparation of faculty teaching in the program. The State was most interested in their degrees held, their areas of expertise, their specific courses assignments, their knowledge of the problems of high-need schools and diverse student populations, and their recruitment from underrepresented groups. As a small college, we rely heavily on adjunct faculty with considerable experience in K-12 education to complement the technology expertise of our full-time faculty. We were concerned that this situation might weaken our application.

NCATE Accreditation Requirements

To further ensure the quality of teacher preparation programs, New York State also set a deadline of the end of 2004 for institutions to achieve accreditation. NCATE was then, and is now, the only organization ready to grant accreditation. Recognized by the U.S. Department of Education, NCATE sets standards of quality by which teacher preparation programs are judged. In the forefront of the recent national call for educational renewal, NCATE has revised its standards and recently released NCATE 2000 Unit Standards with its focus on performance-based standards and assessments. Research studies indicate that students of NCATE-accredited institutions have demonstrated superior classroom performance when compared to their peers at non-accredited institutions (Brown 2001, Nweke 2001, Wise 2001). Iona College made known its intention to apply for NCATE accreditation to comply with the New York State directive.

Among the initial steps in the NCATE accreditation process is the creation of a curriculum portfolio submitted to one of the NCATE Constituent Members, professional organizations that establish discipline-specific standards approved by NCATE. The International Society for Technology in Education (ISTE) is one of the technology organizations that establishes guidelines by which educational technology programs are evaluated. Procedures for ISTE accreditation can be found at http://www.iste.org/standards/ncate/advanced.html.

Seeking NCATE Accreditation

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As mentioned earlier, the Masters Program in Educational Technology at Iona College differs from most programs of its kind in that it is offered through the Department of Computer Science rather than through the Department of Education. The Education faculty had the responsibility of completing the NCATE application; our first responsibility was the completion of the ISTE portfolio. The most significant part of the portfolio was the matrix of performance indicators and experiences to fulfill the guidelines along with a set of course syllabi with the mapped indicators.

A committee was formed to complete the matrix and syllabi. An ISTE consultant provided invaluable assistance in explaining the requirements. For each performance indicator in the matrix, we were required to indicate the specific objectives, topics and assignments in our courses that verified that students had met the indicator. To cross reference the matrix, we were required to map each indicator onto the objectives, topics, and assignments of our course syllabi. Since our program offers a masters degree, ISTE advised Iona to complete the matrix for Advanced Programs consisting of the Educational Computing and Technology Literacy Endorsement Matrix as well as two sections for Educational Computing and Technology Leadership.

It became obvious from the start that compliance with ISTE standards would entail drastic changes in our program. The first problem we encountered was how to meet the over one hundred indicators within our current courses. ISTE requires each graduate of the program to meet each of the performance indicators in the matrix, implying that all the indicators must be met in core courses that are taken by every student. As explained above, New York State requirements necessitated the development of three new courses in the core. On the other hand, there were certain courses that we strongly believed should be part of our program, such as the programming and research courses, and were reluctant to eliminate. In light of all these requirements, our committee had no choice but to expand the core from its existing 18 credits to 30 credits. This left only 6 credits of electives for our students. We were concerned about the lack of diversity in our students' course of study but there were no other viable alternatives.

Each committee member took responsibility for a group of core courses and revised the syllabi and assignments to meet the appropriate indicators for the course. We met periodically to ensure consistency and completeness. The initial feedback from our consultant on the first three sections of the matrix revealed other problems in our procedures. Many indicators had several parts and we had not been sufficiently attentive to each and every one of them but rather addressed the general intention of the indicator. We learned the importance of using the language of the indicators in our syllabi. Another problem that surfaced was our misconception that merely addressing an indicator in class was sufficient evidence that it was met. Our consultant made us aware that performance indicators could only be properly satisfied through specific assessments such as examinations, assignments, and projects. This realization forced us to revisit each of our syllabi to provide compliance with the indicators though performance-based assessments. We also encountered difficulty in completing all of the indicators to our satisfaction. Some of the indicators required equipment that we do not have and that we might have trouble acquiring. Other indicators could only be properly met in an extensive field experience that we are unable to provide at the current time. By the end of this iterative process, we added another new course to the program (bringing the total of new courses to four) and significantly revised four others. Iona College submitted its ISTE portfolio to NCATE in August 2001. A complete description of the revised program can be found at http://www.iona.edu/cs/gradreqs.htm

Implementing the Program

We have already achieved one of our goals: New York State has registered our newly revised Masters Program in Educational Technology. We were gratified that the State recognized the strength of our program and implicitly acknowledged that our use of adjuncts in the program did not detract from but rather enhanced the students' experiences. After approval by the state, the next challenge was to implement the new program. A three-year projected schedule had to be revised to reflect the changes. The scheduling was complicated by several factors, including the stipulation that all core courses had to be offered on both campuses within a reasonable cycle. Students already in the program, who had matriculated under the old curriculum, were given the option of completing their existing program plans or switching to the new requirements. Most opted to complete their old plans, making substitutions where necessary. A summary of the changes was prepared and distributed prior to registration for fall of 2001 for all new and non-matriculated students. New requirements could also be found in the college catalog and the department website. The more structured program required scheduling additional advisement hours to

explain its effect on the students' programs. The adjunct faculty teaching in the program had to be brought up to date on the changes, and made aware of the revisions to their course outlines, which they were no longer permitted to modify. In general, they were pleased with the specificity of the outlines, and they adjusted their teaching accordingly. Collection of assessment materials became more crucial, and the department is still experimenting with methods of collecting and storing those assessments. Electronic portfolios are being developed for each offering of the courses.

Conclusion

We discovered that the new courses the State required us to offer were well received by our students. Our K-12 teachers are constantly looking for effective ways to integrate technology into their classrooms and they found these courses most beneficial to them and their colleagues.

At the time of writing, we are still awaiting a response from ISTE on our curriculum portfolio. Although the first round of the ISTE accreditation process was long and arduous, it yielded some positive outcomes. Perhaps for the first time, the committee examined each course in minute detail to reduce duplication of course material, and to eliminate areas that were outdated and replace them with more meaningful, relevant and current topics and assignments. This purposeful "house-cleaning" can have a cathartic effect. Our program has been invigorated with the latest theories in educational technology and, as such, is a more challenging but rewarding program. With its emphasis on performance-based assessments, we are convinced that our revised Masters Program in Educational Technology will better prepare our students to meet the challenges they will face in their own classrooms.

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How Graduate Teacher Education Students Addressed Timely Teaching and Learning Issues Through the Construction of a Website for Their Colleagues

Dr. Candy Beal, Department of Curriculum & Instruction, College of Education, NC State University, USA
<candy_beal@ncsu.edu>

Dr. Lisa Grable, Department of Curriculum & Instruction, College of Education, NC State University, USA
<grable@unity.ncsu.edu>

Abstract: This research paper examines a unique curricular design project that demonstrates the value of recursive learning. A curriculum integration project completed and reported on last year, Wetlands 2000, was thoroughly explained and used as an example of taking curriculum integration theory to practice in a larger project that examined the value of using a curriculum integration approach to teaching and learning. A website on curriculum integration was built in support of colleagues' who question the value of teaching solely for recall of discrete facts and who are frustrated by education's pressure to move in this direction.

As educators, we teach and learn about a spiraling curriculum. The first step is to introduce and explore a basic idea. After students are able to understand what we have taught, we then cycle back and expand on the original idea. This method helps develop new dimensions of thought and information. The time spent in discussion and development of the idea is Vygotsky's (Vygotsky, 78) intermental processing which shifts to intramental processing as students internalize the information and seek to make meaning for themselves.

Educators are constantly using the spiraling curriculum method of teaching. For experienced educators it may be so routine that they may not spend time reflecting on the process itself. This paper describes how a curriculum integration project implemented in a technology enabled environment and reported on last yearbecame a component of an even larger technology project for preservice and graduate teacher education. In other words, we spiraled back to the original learning and deconstructed that project to illustrate the process of curriculum integration, the subject of the new learning.

The Wetlands 2000 Project was a curriculum integration /service learning project that was reported on at last year's SITE Conference in Orlando, Florida. It involved one hundred 8th graders and their teachers and demonstrated the power and scope of learning that is possible in a technology enhanced learning environment. The project demonstrated classic curriculum integration. Students asked about, researched and reported on big issues of social/environmental injustice using technology applications as diverse as GIS, spread sheets, PowerPoint presentations and on-line research sites. The eighth graders did action research at the wetlands site and made a public/university-wide presentation of their project findings. It was a highly successful, exhilarating, exhausting process and, once it was completed, the class moved on to other learning opportunities. Who would have known that this project would play a major role in another, larger effort involving graduate students studying and building a website about curriculum integration?

The graduate students selected the topic, curriculum integration, to support their argument that children learn best when differentiated instruction is used to fully engage them in issues of personal and global interest. They sought to demonstrate that testing for knowledge of discrete facts alone does not indicate true reflective knowledge. Their frustration was borne of our country's mania for using standardized testing as the sole measure of learner achievement. Their audience was others like themselves who were struggling with the question of whether to teach the children or teach the test.

They based their website work on James Beane's (Beane, 97) study of curriculum integration and their own experiences using curriculum integration in the classroom. They deconstructed the theory and process of curriculum integration and then build a website to inform colleagues about curriculum integration's application to middle school education. Components on their website (<www.ncsu.edu/chass/extension/ci>) included :

- $ a thorough, user-friendly study of curriculum integration
- $ an explanation of how curriculum integration, based on the needs of early adolescents, applies to teaching and learning in the middle school classroom
- $ a one hundred year time line with drop down information that traces the development of curriculum integration in the context of the history of education and

$ a section on evaluation and assessment, highlighting both formal and informal methods to examine students' progress.

Graduate students determined that the most critical part of the website would be an example that demonstrated how curriculum integration could be used in an actual class project. Having heard about the Wetlands 2000 Project undertaken by their undergraduate preservice colleagues, they decided that highlighting that project would be a way to show the actual application of curriculum integration theory. In an effort to offer a unique approach to learning about Wetlands 2000, the students chose to fictionalize the actual story. They called it *Pam's Story*.

In *Pam's Story,* the reader meets a new teacher and follows her through the first semester of her first year of teaching. Readers are introduced to the members of her team, become familiar with the issues teachers face on a daily basis, and join her team as they develop and implement a curriculum integration project, Wetlands 2000. Photographs and sketches from the actual project appear throughout the chapters of the story. Graduate students included all of the teaching and learning approaches that were employed in the real project. They related theory to practice in all aspects of implementation of Wetlands 2000. Pam's story ends with the team celebrating its success by visiting a global issues museum. In the final chapter, the teachers and students find themselves addressing a new concern that will require building yet another curriculum integration unit. The graduate students cleverly provided a link to another website, SwimDog, that was developed by undergraduates as a curriculum integration resource. The teacher education class also included a forum in the site to enable all teachers to discuss issues regarding curriculum integration. It joins a resources and references section that can be used to learn more about curriculum integration.

This project demonstrates that learning in a technology enabled environment makes it possible to fully access information and activities previously undertaken and currently archived. Past projects can be recycled into other contexts. Time and energy that was devoted to previous learning activities becomes value added when it is used as the foundation on which to build new knowledge. Students see that learning is a dynamic, recursive process, the results of which can be more readily shared through technology.

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The Use of a Web-Based Professional Development Forum to Enhance In-service and Pre-service Teacher Education

Catherine Brown
Department of Curriculum and Instruction
Indiana University
United States
cathbrow@indiana.edu

Yusuf Koc
Department of Curriculum and Instruction
Indiana University
United States
ykoc@indiana.edu

Rebecca H. McGraw
Department of Curriculum and Instruction
Indiana University
United States
remcgraw@indiana.edu

Kathleen Lynch
Department of Curriculum and Instruction
Indiana University
United States
rklynch@indiana.edu

Abstract: This paper is a description of how pre-service and in-service secondary mathematics teachers use a web-based professional development tool to examine, reflect on, and discuss classroom practices. The teachers are engaged in a professional development project in which they work in teams with each other and with mathematicians and mathematics educators to collaboratively plan, implement, and reflect on mathematics lessons. The web-based environment supports their work by providing discussion areas and document building capability. The web site also contains video clips of lessons and lesson artifacts that can be used to stimulate discussion about teaching and learning. Ultimately, video of the lessons developed through the project and artifacts from these lessons will be included on the web site. Research related to this project will examine the interactions among the team members and the ways in which the web-based forum may be used to support teacher education.

Introduction

We present how technology has been used in two intersecting innovative teacher education activities. In particular, we describe how we have provided a rich context for pre-service and in-service mathematics teachers' professional development through the use of information technology in the form of a web-based professional development tool (the Inquiry Learning Forum (ILF)). The ILF website has been used in both a professional development project (the Collaboration for Enhancement of Mathematics Instruction (CEMI)) and in a secondary mathematics methods course at Indiana University.

The Inquiry Learning Forum (ILF)

The ILF, hosted at Indiana University, "is a web-based professional development tool designed to support a community of in-service and pre-service mathematics and science teachers creating, sharing, and improving inquiry-based pedagogical practices" (Barab, Makinster, Moore, Cunningham & the ILF Design Team, in press, p. 3). The virtual facilities for the community include classrooms that can be visited, various types of meeting rooms, a library, and "workrooms" that provide "an on-line space for groups to form working circles, or sub-communities, to facilitate collaboration on a particular project, product, or goal" (Barab, Scheckler & Makinster, 2001, p. 7). Thus the ILF creates a comprehensive web-based professional development community through which the participants connect with each other and participate in interactive construction of professional knowledge (Barab, et. al., in press).

The CEMI Project

CEMI seeks to engage teams of middle and high school mathematics teachers, university mathematicians, university mathematics educators, and pre-service secondary mathematics teachers in an activity that is inspired by *Lesson Study*, a form of professional development that is widely used in Japan. In Japan, an entire school has a general theme for the *Lesson Study* and each lesson study group develops a lesson that relates to the theme. *Study lessons* are then taught in regular classrooms. An implemented lesson is observed by many teachers in the school and is followed by a public discussion of the lesson with the planning group. This cycle of meetings and lessons is repeated several times during a year.

CEMI Lesson Study Groups also work through cycles of planning, implementing, and reflecting on individual lessons. Responsibility for planning and reflecting on lessons is shared among participants. The classroom teachers are responsible for implementing the lessons while other group members observe and take notes. The CEMI project is not simply trying to engage U. S. secondary mathematics teachers in Japanese Lesson Studies, but rather to adapt this model of professional development for several purposes. These include providing professional development for all of the participants in the project and creating an extensive community of people with diverse perspectives with the common goal of providing secondary students with quality mathematics education. The evaluation/research component of the project seeks to understand these activities and their impact on the participants and the participants' classroom teaching.

The CEMI project conducts many of its activities through the ILF website. Lesson Study Groups regularly meet face to face, but the actual writing and co-construction of lesson plans occurs on ILF site through the use of a document builder tool. Discussion of the plans and reflection after teaching also occurs both face to face and on the ILF. Ultimately, video of the lessons developed through CEMI activity and artifacts related to these lessons (e.g., student work, teacher reflections) will be included on the ILF site. Through the ILF, the work of each Lesson Study Group is made available to others in the project and will eventually be visible to all ILF members. CEMI participants have recently decided to take a break from the development of new lessons and spend 2-3 months more intensively reflecting on the lessons that have been developed and taught over the past 18 months. In addition, participants will read and discuss books and articles related to the teaching and learning of mathematics. These reflections and discussions will take place in both face to face meetings and on the ILF.

The Methods of Teaching Secondary Mathematics Course

It is a goal of every teacher educator to stimulate meaningful discussion about issues related to teaching among their students and to help students become reflective about their own and other's teaching. The ILF is used by Indiana University's secondary mathematics education students for both these purposes. Students in the secondary mathematics methods course are participants in CEMI Lesson Study Groups, but they also use the ILF in other ways. Students are required to virtually visit mathematics classrooms on the ILF. This provides a common classroom experience for all students. Available for each lesson are written plans and video clips of implementation, student work and teachers' own reflections, connections to state and national standards, and references to related resources. Discussions of these visits occur on line and in class, enabling students to use real classrooms as a basis for developing concepts of teaching and learning mathematics. Students also use the ILF document building tools to create and revise their own lesson plans, making the process visible to both instructors and other students. The ILF library contains web-

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based teacher related resources and lesson ideas. Students are required to explore other web sites and add at least one additional site to the library resources, with a brief review and suggestions for use. Finally, students use the ILF to discuss books and articles they've read and other methods class experiences.

Research Components and Issues

Research related to the ILF, CEMI, and the secondary methods class has several foci including (a) the role of the ILF in helping mathematics teachers, mathematicians, teacher educators, and secondary methods students develop "communities of practice" (as defined by Wenger 1998); (b) the integration of Japanese Lesson Study methods into U.S. teacher professional development and the ways in which the ILF enhances this process; (c) the characteristics of face-to-face and on-line discussions and the ways in which the ILF can be used to support reflection on teaching and learning; and (d) the roles of teachers, education students, teacher educators, and mathematicians in Lesson Study Groups and on-line and face-to-face discussions. Wenger (1998) identifies four characteristics that define communities of practice: negotiating meaning; preserving and creating knowledge; spreading information; being a home for identities. Because we believe these are important characteristics, we are beginning to examine data to determine the extent to which the Lesson Study Groups and the methods class exhibit these characteristics.

Conclusion

The ILF provides a technological tool that provides opportunities for professional growth for pre-service and in-service secondary mathematics teachers as well as other mathematics educators. Our use of the ILF in the CEMI project and in the secondary mathematics methods class is only in its second year, so conclusions about its value must be tentative. However, we are convinced that the ILF is helping us introduce pre-service teachers to reflection on practice in ways that were previously unavailable and that are valuable. Similarly, the ILF provides a mechanism for engaging in-service teachers and other mathematics educators in collaboratively constructing and examining practice in new and powerful ways. Whatever terms are used to describe what is developing – discourse community, community of practice, collaborative, or something else – the bottom line is that through the use of the ILF we have people talking with each other and working together who have not previously done so.

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Building an Educational Technology Masters Degree Program with ISTE/NCATE Standards as the Foundation

Cathy Cavanaugh, Ph.D. Curriculum and Instruction, University of North Florida, USA. ccavanau@unf.edu

Terry Cavanaugh, Ph.D. Curriculum and Instruction, University of North Florida, USA. tcavanau@unf.edu

Abstract The NSDC 2001 staff development standards and ISTE's 2000 standards for educational computing and technology programs served as the foundation for a new Educational Technology Master's degree program at the University of North Florida, designed to lead educators in the region toward the innovation stage of educational technology integration. Program development began with a thorough review of existing courses and their alignment with national standards. A team of professors created a matrix of course objectives and standards in order to identify gaps in the existing program. Existing courses were restructured, and new courses were designed to meet needs.

Preparing teachers to teach with technology

In the rapidly changing world of the information age, it is more critical than ever that all teachers be life-long learners, and that they collaborate to continuously improve their practice and their results with students. A priority of the US Department of Education is preparing prospective teachers to use technology as a tool for teaching and learning and to work effectively with diverse students (US DOE 2001). Lack of professional development for technology use is one of the most serious obstacles to fully integrating technology into the curriculum (Fatemi, 1999; Office of Technology Assessment, 1995; Panel on Educational Technology, 1997). "The transformation of classroom technology from hardware, software, and connections into tools for teaching and learning depends on knowledgeable and enthusiastic teachers who are motivated and prepared to put technology to work on behalf of their students," states the CEO Forum on Education and Technology (1999).

Jamie MacKenzie (1993) indicates stages of technology mastery for teachers, from survival through innovation. The needs at each stage are different. Studies have outlined four stages through which teachers may pass in learning and applying new technologies in their teaching: (1) Survival-- struggle, teacher-directed, (2) Mastery-- coping, confidence, (3) Impact-- tech-enhanced, learner-centric, (3) Innovation-- restructures learning.

Leading educators toward the Innovation stage requires effective professional development experiences. The National Staff Development Council revised the Standards for Staff Development in 2001 to better meet the needs of today's teachers and students. The NSDC standards guide professional development of teachers in all facets of education. As a guide to staff development in technology, the International Society of Technology in Education has provided standards for Professional Preparation in Educational Computing and Technology Literacy (NCATE 2000). The two sets of standards have many parallels, and served as the foundation for the development of a new Educational Technology Master's degree program at the University of North Florida, designed to lead educators in the region toward the innovation stage of educational technology integration.

Educational technology master's degree program development

Prior to the development of the new Educational Technology Master's degree program, UNF had four technology-centered "tracks" in its Master's catalog. The tracks were minors within elementary education and secondary education majors. Both the secondary and elementary education programs offered tracks in instructional technology and in computers in education. The four technology tracks were developed at different points over the last decade and for various purposes, but the result was program profusion and confusion. Beginning fresh on a new

program would have several benefits: students would join one clear program, the program would be extensively updated, and the program would reflect current standards not in existence when the original programs began. The names and descriptions of the new courses better reflect current practice, and together they meet new standards implemented at the state and national levels.

The new program is outlined below:

College Core courses in Foundations of Education Research, and Education in America.
Curriculum and Instruction Core courses in School Curriculum and Models of Teaching.
Educational Technology Requirements: Computers in Education, Enhancing Instruction with Technology, Educational Technology Systems, Educational Design for Digital Media, Educational Multimedia OR Educational Web Design, Electives such as Telecommunications or Technology for Special Populations, Educational Technology Issues capstone course.

The process of developing the new program began with a thorough review of existing courses and their alignment with national standards. A team of instructional technology professors created a matrix of course objectives and standards in order to identify gaps in the existing program. To streamline the transition from the existing program to the new one, existing courses were restructured, and new courses were designed to meet needs. The most significant new course is the capstone Educational Technology Issues course, which includes a strong field-based project. The field project requires the Master's students to work with children in classrooms on innovative technology-based experiences, and to create and deliver professional development experiences to teachers. UNF's new program addresses each of the NSDC 2001 staff development standards and ISTE's 2000 standards for educational computing and technology programs.

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The Learning Schools Programme: an analysis of teachers' professional development and pupil gains in a lottery-funded ICT training programme for in-service teachers

Dr John L Chatterton j.chatterton@shu.ac.uk
Head of IT
Sheffield Hallam University
School of Education
Collegiate Crescent Campus
Sheffield S10 2BP
England

Introduction

In the UK, the New Opportunities Fund of the National Lottery has provided funding of £230 million ($330 million) to train teachers, not in the basic skills of computer use, but in the much more complex areas of the use of ICT in teaching and learning, planning and assessment and in the continuing professional development of teachers. The expectation is that all teachers will at least meet the ICT competences laid down for the training of new teachers in all subject areas and over all phases of education. Lottery funding provides not more than half the cost of the projects it supports, so schools are expected to contribute teacher-time for the training as their 50% of the funding. At the same time, the government is spending some £500 million ($700 million) on provision of hardware for schools and every school is gaining a broadband connection to the internet, with a nationally supported school-web structure — every school has a web address and every teacher and pupil is to have a personal email address.

Standards for the training were set out by the government and would-be providers of the training were asked to submit their programmes for approval. The approval process resulted in a mixture of provision: some subject-based, some taking a whole school approach; some providers worked within a defined region, others worked nationally.

The Learning School Programme, with which this paper is concerned, is a national provider which takes a whole school approach, while providing specialised materials for the various subjects and phases. The Learning Schools Programme was formed from the co-operative efforts of the Open University, the largest provider of open and distance learning courses, and RM plc, a major supplier of ICT systems and software in the education sector in the UK. The author is currently co-ordinating the delivery of the programme to more than 2500 teachers across a large area of England.

As we pass the half-way point of the programme, which is due to finish in 2003, evidence is beginning to accumulate about teachers reactions to the programme, changes in their professional and classroom activities and their perceptions of the consequent impact on pupil motivation and attainment.

Teachers and ICT

The Learning Schools Programme begins with a needs analysis undertaken by the individual teachers and covering the four basic areas of planning, teaching, assessment and reporting and personal professional development. Teachers are guided through an examination of 44 professional tasks covering the four areas and, using the professional development record, they devise an individualised programme according to their needs.

Professional Development Record **Name of teacher:**

Profile of Training Needs, relevant Programme Elements, and Professional Tasks **Prog**

Training Need	Can do	Need to do	Programme Elements	Professional Tasks (key overleaf)	com
Planning					
1 Incorporate ICT appropriately and effectively in the *setting of objectives* for all subject teaching.	☐	☐	See Planning 1 on the Routeway card	1, 12, 14, 15, 27, 28, 33	
2 Exploit ICT appropriately and effectively in *establishing expectations* of what all learners can achieve.	☐	☐	See Planning 2 on the Routeway card	1, 2, 3, 4, 12, 27, 28, 33	
3 Select and create ICT *resources* and identify effective forms of *classroom organization*.	☐	☐	See Planning 3 on the Routeway card	4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 27, 28, 30, 33	

figure 1: part of the Professional Development Record used in the needs analysis

The teachers are supported during their training by a mixture of face to face tuition, books, multimedia CD, videos, online support and computer moderated conferences: further details will be provided in the paper.

During the training period, the teachers build up a portfolio documenting the work they have done and the changes which have occurred in their planning, teaching etc. A senior member of staff in each school takes responsibility for organising the school-based part of the training and s/he is responsible, with the support of the Learning Schools Programme's School Adviser, for assessing the portfolios and monitoring the progress of the staff. At the end of the programme, each teacher is expected to plan and teach a series of lessons involving the use of ICT and to evaluate its effectiveness in terms of the subject-based objectives / lesson outcomes. On completion, the teacher completes an evaluation of the programme and a personal development plan for furthering their use of ICT.

The data provided by the programme mechanisms has been supplemented by interviews with the teachers to provide a rounded picture of the progress made and the changes occurring in the classroom. These demonstrate a wide range of outcomes and show how these outcomes are dependant, inter alia, on the underlying attitudes of the teachers and on the rapid changes in hardware provision which have been concurrent with the training programme.

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Conclusions

The data so far have been very positive, with the great majority of teachers reporting that the programme has helped them to raise their awareness of the possibilities of the use of ICT in subject teaching and has given them the confidence and encouragement necessary for them to begin to use ICT in the classroom. Virtually all the teachers on the programme were making significantly increased use of ICT for professional purposes by the end of the programme.

Where progress was slower, it was generally linked to staff having limited access to ICT facilities within the school - caused in no small part by the rapid increase in demand for the ICT facilities the school had. This was particularly true of the early entrants to the training, where the investment programme had not taken full effect.

Short Bibliography

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RM plc	www.rm.com

Integrating technology into teaching: exploring a teacher learning community for teacher professional development

Haojing Cheng, Doctoral candidate, Michigan State University
Mary Ann Robinson, Technology Outreach Coordinator, Mecosta-Osceola Intermediate School District

Abstract:

The push for integrating technology into k-12 curriculum from social and political forces has exerted tremendous pressure on schools and education support institutions to provide adequate professional development opportunities for teachers beyond just fundamental technical training. According to OTA (1995), less than half of American schools provide teachers with training on basic computer skills, let alone the training on instructional uses of computers. It is not a surprise to see not many teachers actually use technology regularly in their teaching (OTA, 1995; McKinsey, 1996). Such conflicts between the call of the reforms and the reality of the teachers' work require teacher learning opportunities that directly address the emergent problems that teachers confront in their practices.

The importance of learning communities for professional development is much discussed in literature (Schwab, 1976, Lave and Wenger, 1991; Hallwa and Lindy, 1999, Putnam and Boko, 2000). In the past 10 years, the calls for a commitment to alternative means of inservice teacher professional development have increased exponentially. This is considered as the key to any and all educational reform (Wilson & Berne, 1999).

This paper intends to examine the role of a teacher learning community in relation to teacher learning for technology integration and professional development. By focusing on the content and conditions of teacher learning through this teacher support group, this study will deepen our understanding of the role of teacher learning community for professional development of inservice teachers.

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Scaffolding Graduate Student Learning Through the Use of Gen www.Y Students

Alice Christie, Arizona State University West, US

This paper explores the benefits to all stakeholders when student mentors are used within a graduate course in educational technology. Stakeholders include the university professor, thirty-four practicing K-12 teachers working toward an M.Ed. in Educational Technology, and three eighth grade students proficient in using some of the software used in the graduate course.

The purpose of the course is to develop graduate students' skills and sophistication with a variety of multimedia tools appropriate for K-12 teachers. In addition, these students produce an electronic portfolio that provides evidence of their expertise in educational technology. Students use *Inspiration*, *PowerPoint*, *HyperStudio*, *iMovie*, and a variety of graphics editing programs.

This study incorporates Dennis Harper's *Generation www.Y* model of training K-12 students to assist teachers with technology use and curricular integration. The *Gen www.Y* students developed technology skills, collaboration skills, and presentation, teaching, and leadership skills during training sessions throughout the school year. Their training included an in-depth exploration of *iMovie* as well as numerous opportunities to collaborate with peers and present their ideas and work to large audiences. During the summer, these Gen www.Y students assisted graduate students as they learned to use *iMovie*.

This paper discusses benefits to the university professor, the graduate students, and the Gen www.Y students. Data sources included observations, open-ended surveys, and focus groups. The paper also delineates the details of the partnership between the university and the K-12 school district where the Gen www.Y students attended school.

A WEB-BASED GUIDANCE SYSTEM WAS IMPLEMENTED FOR THE LIVING TECHNOLOGY TEACHER

Chu, Yao-Ming. National Kaohsiung Normal University Of Taiwan.
Department of Industrial Technology Education
t1179@nknucc.nknu.edu.tw

Yang, Hung-Jen. National Kaohsiung Normal University Of Taiwan.
Department of Industrial Technology Education
hjyang@nknucc.nknu.edu.tw

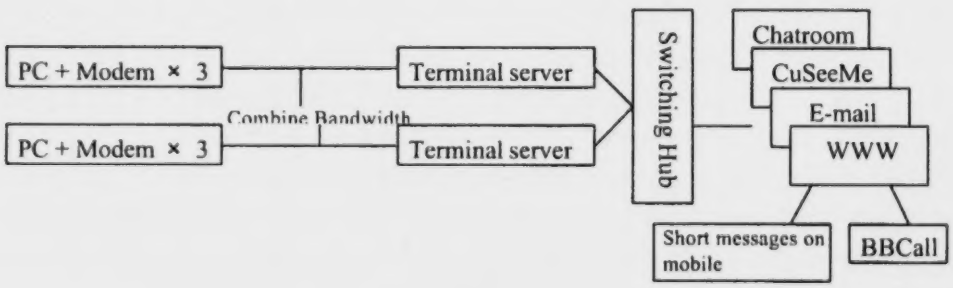
Chao, Shih Van. National Kaohsiung Normal University Of Taiwan.
Department of Industrial Technology Education
jim@controller.nknu.edu.tw

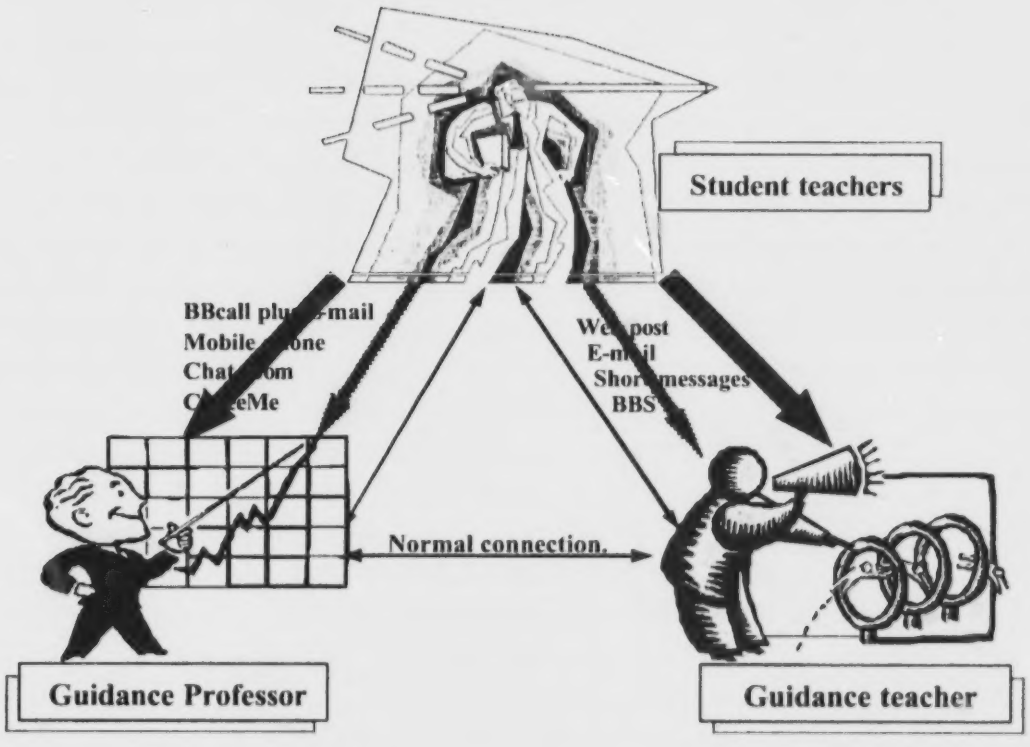
Abstract: The purpose of this study was to identify a junior high school technology student teachers' remote teaching guidance model through Internet. A Web-based guidance system was implemented for the beginning Living Technology teacher.

This system included seven communication paths, which were WWW, E-mail, BBS, Chat Room, Videoconference plus E-mail and Mobile phone/BBCall and mobile short messaging to support the guidance for beginning teachers. This system was mainly used to establish communication among student teachers, guidance teachers, and guidance professors.

Network connection Method Of Remote Teaching Guidance

A survey instrument was design to collect data from all three groups for evaluating the system. Statistical analysis result was discussed. The network resources used in the system were also presented





Real-time guidance needed start.
Include BBcall plus E-mail, Mobile phone, Chat room, Videoconference.

Normal connection.

Non real-time guidance needed start.
Include Web post, E-mail, BBS, Short messages on mobile phone.

The researcher found that WWW and Email were most used by professor and beginning teachers and they worked very well. They were seems not used to communicate with each other by real time communication tools such as CuSeeMe or Chat even though there was no network problems. Beginning teachers were ask question directly to their colleague—senior teacher instead of professor. Therefore, focus on senior teacher's guidance skill was important to guide a beginning teacher.

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Beyond the Classroom:
Using technology as a tool to engage and empower students outside of the classroom

David Michael Cobb, Jr.
The Oakridge School
Arlington, Texas
mcobb@mrcobbs.net

Abstract: As American schools increasingly invest in technology for schools and classrooms, recent research has demonstrated that increases in infrastructure are not equating to increases in technological integration in the learning process. Much more than infrastructure development must occur for computers to be integrated into the curriculum and used in sophisticated ways to engage students. Teachers must be given the training and confidence must be developed to encourage infusion of computer technology into their teaching Additionally, some teachers who are using technology may not use it to its fullest advantage and with the most efficient means. This guide will focus on methods to engage students and increase contact hours virtually through the integration of technological tools. Four methods of technological integration will be discussed for expanding curriculums beyond the classroom: web page publishing, computer mediated communication, online lessons and activities, and portable curriculum resources.

Introduction

History of Computers in United States' Schools

In 1967, Sir Eric Ashby referred to a "revolution in education" that would occur as a result of evolving technologies in the area of electronic media (Ashby, 1967). Ashby and his contemporaries could not have imagined the realities of the revolution that have occurred since the 1960s. Since that time there has been much enthusiasm, anticipation and conjecture with regard to the role and impact of new technologies and what effects they would have on education in our schools.

In the mid 1970s a few select High school students were using computers as part of their studies. The few students that were exposed to computers in schools were probably involved with elementary computer programming exercises in a language like Fortran, or supplied raw data to be used within a simulation program run on the machine. Generally there was no direct access to a computer in their school. Students from across the country would send special cards marked with code to be entered into a distant computer. Everybody hoped that the results arrived back at school in time for the next lesson but it could be more than a week before students got to see how their efforts fared. It was bad luck for a student sending in work for a Fortran exercise if the only error made was, for example, to forget a backslash or semicolon in a line of code. The role of the teacher in these circumstances remained unaffected. These exercises only served as supplementary lessons to a busy mathematics curriculum. The technology did not help achieve the existing mathematics curriculum it simply added to the curriculum (Campbell-Kelly, 1996).

Yet by the end of the 1970's, microcomputers began to increasingly appear on the consumer market. Machines like the Apple II, Tandy TRS-80 and Commodore were successfully marketed to household consumers. Early on few made it into schools and even fewer into classrooms. The beginning of the 1980's also saw a few primary school teachers taking an interest in microcomputers and their use in classrooms. In most cases, early teachers using technology were enthusiasts or computer hobbyist. However, computing as such was still seen by the majority of educators to be the exclusive domain of computer scientists, mathematicians or businesses. For one reason, microcomputers were extraordinarily expensive and out of the fiscal reach of most schools (Campbell-Kelly, 1996).

By the beginning of the new decade, computers were acknowledged as effective and efficient tools in business. Schools began to be asked questions about possible educational applications of computers in schools. Yet, the cost and availability of computers made the questioning merely philosophical. In 1981, IBM introduced their version of the personal computer (PC) for use in home and schools. The Apple Computer Corporation responded to the growing competition with an offer to assist schools with breaking into the technological age. Many schools gladly leaped into the new realm with the offer of a 64K RAM Apple II+ computer, with a 128K capacity floppy disk drive and color monitor for free or at a very low price. This helped set the scene for educational computing to take off in both primary and secondary schools. All of a sudden, just about every school community began to see computers for their students as a goal. In 1983, the release of the less expensive and more powerful Apple IIe and Commodore 64 models increased the already piqued interest of politicians, administrators, parents, and teachers on possible educational benefits (http://www.digitalcentury.com/encyclo/update/comp_hrd.html). As the computer market exploded in the 1980s, schools increasingly moved computers into schools and classrooms. The number of personal computers in use in homes and schools more than doubled from 2 million in 1981 to 5.5 million in 1982 (Office of Technology Assessment, Teachers and Technology: Making the Connection [OTA, 1995], 1995).

As the technology infrastructures were being constructed in schools across the country, a new vehicle for technology integration was being developed. The Internet traces its history back to a U.S. Department of Defense research project called ARPANET started in 1969. However, the resources of this computer network were not opened to non-military users until the 1970s,

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and big universities were the only early takers of the newly termed Internet. Yet in 1989 Tim Berners-Lee, a physicist working at CERN, the European Particle Physics Laboratory, was developing a collection of "hyperlinked" pages of information distributed over the Internet. The information would be distributed via a network protocol called HTTP (hyper-text-transfer-protocol) in what Berners-Lee termed the World-Wide-Web (Web). With the new advances with computer hardware, software, and now the Web, schools and districts began to allocate more of annual budgets to increased numbers of computers as tools for student retention and as a quantifiable demonstration of advancement. The Web has made the benefits of the computer and the Internet so much more readily seen. In the 1992-1993 school year, the National Center for Education Statistics estimated that public and private elementary and secondary schools spent over $280 billion on technology infrastructures (Digest of Education, table 33). Through the early 1990s schools endeavored to develop technology plans and programs. In 1992 the number of computers in schools had surpassed 3.5 million and more growth was occurring (OTA, 1995). In 1994, the Clinton Administration set a goal of connecting every classroom and library in the country to the Internet. As this goal was announced only 35 percent of schools and 3 percent of classrooms were connected to the Internet. By 1999, 95 percent of all schools, and 63 percent of all classrooms had been connected to the Internet, with one instructional computer with Internet connection for every six students (Orszag, 2001).

Since the turn of the century, educators have begun to explore with more constructivist technological integration programs. Constructivist theory argues children actively construct their knowledge. Rather than simply absorbing ideas spoken at them by teachers, or somehow internalizing them through endless, repeated rote practice, constructivism proposes that children actually invent and develop ideas through active learning (Forman, 1988.) Thousands of schools have invested in laptop computer labs and classroom laptop sets. Over 500 high schools across the nation have gone to full laptop learning environments. In a full laptop environment, each student has his/her own laptop for school and home. These innovative schools are on the cutting edge and complete research has not been done on the eventual effectiveness of this type of endeavor. However, early results show great promise in engaging, empowering and transferring ownership of learning to the students. Several studies suggest educational benefits related to laptop use. Specific benefits noted include increased student motivation, a shift toward more student-centered classroom environments, and improved school attendance (Stevenson, 1998). In the 1998 Stevenson study of a laptop pilot program in Beaufort, South Carolina students with laptops demonstrated a "sustained level of academic achievement" as opposed to students not using laptops who tended to decline during the same period. The study also states that academic benefits were most significant in at-risk student populations (Rockman, 1998).

Research into the educational use of laptops has only begun; laptops have not been in place long enough to generate complete studies of their impact on student achievement.

Integration of Technology In Schools

Since Ashby's prophetic prediction of a "revolution in education" we have seen incredible advances in computer technology and technology availability for schools. Unfortunately, during the great infrastructure build up of the 1990s the needs of teachers with regard to professional development went almost entirely ignored. Increasing numbers of computers found their way into many schools with little planning for integration to improve existing curriculums. Unsure of what they could do with these computers, or lacking confidence to use them or time to learn how, many teachers simply ignored them or left it to the "computer teachers" to use the equipment. So although through the years of tremendous increases in computer hardware and software availability in schools, few teachers have kept up with using the technology to enhance an engaging learning environment (Hunt & Bohlin, 1995). Yet, research clearly demonstrates the potential worth of computers as a part of student learning and national, state, and local educational standards have named computer implementation as a primary goal (National Center for Education Statistics [NCES 1995], 1995). Recent research has given strong evidence that technology brings incredible educational benefits. John Cradler, Technology Director for the Chief State School Officers of California conducted a study entitled "Summary of Current Research and Evaluation Findings on Technology in Education" for the Far West Laboratory, an education think-tank. The study's findings clearly indicate that technology has important benefits to curriculums, students, and teachers. The following is a list of outcomes for students and teachers with effective technological integration in curriculums.

For Students:

- Increases performance when interactivity is prominent.
- Increased opportunities for interactivity with instructional programs.
- Is more effective with multiple technologies (video, computer, telecommunications, etc.).
- Improves attitude and confidence-especially for "at risk" students.
- Provides instructional opportunities otherwise not available.
- Can increase opportunities for student-constructed learning.
- Increases student collaboration on projects.
- Increase mastery of vocational and work force skills.
- Help prepare students for work when emphasized as a problem solving tool.
- Significantly improves problem solving skills of learning handicap students.
- Improves writing skills and attitudes about writing for urban LEP students.

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- Improves writing skills as a result of using telecommunications.

For Teachers:

- Less directive and more student-centered teaching.
- Increased emphasis on individualized instruction.
- More time engaged by teachers advising students.
- Increased interest in teaching.
- Interest in experimenting with emerging technology.
- Teacher preferences for multiple technology utilization.
- Increases administrator and teacher productivity.
- Increased planning and collaboration with colleagues.
- Rethinking and revision of curriculum and instructional strategies.
- Greater participation in school and district restructuring efforts.
- Business partnerships with schools to support technology.
- Increased education involvement with community agencies.
- Increases in teacher and administrator communication with parents.

One of the top reasons teachers give for low level of technology inclusion is lack of training (Bosch & Cardinale, 1993). A large amount of reports and studies have revealed that both beginning and veteran teachers feel inadequately prepared to integrate technology into their curriculum. In a 1995 survey, the Office of Technology Assessment found less than 10 percent of new teachers felt prepared to implement technology in an effective manner (Abdal-Haqq, 1995). Yet the nation is embracing technology at an incredible pace. A January 2000 report from the White House stated that more than half of all American households now use the Internet, with "more than 700 new households being connected every hour." In a 1995 study over eight in 10 families were planning a PC purchase in the next year and cited "children's educational use" as the reason for the purchase. With all the recent research pointing to the benefits and proliferation of computers in education and American homes the need for effective technological integration has never been greater (Schacter, 1999).

While advances in the technology have made computing much more accessible and user friendly, many teachers still lack a clear starting place to begin integration. It has been estimated that secondary school students spend only 25 percent of their computer time doing productive learning with technical assistance (Becker, 1993). And many teachers who have begun integration lack direction on how to continue to build critical thinking and student based learning through the use of technology. But what they are missing out on is an opportunity to experience first-hand the benefits of a cooperative learning environment where teacher and student can expand learning objectives. Teachers need to be able to fall back on a readily accessible support mechanism for those times when confidence and direction are challenged and threaten to frustrate their efforts and waste valuable time (Johnson, 1997).

Despite the difficulties to study the ever changing field of technology and its effects on education, the majority of recent research gives evidence that computers offer great educational benefits (Orszag, 2001). A recent study conducted by the Miken Institute concluded that effective computer integration into curriculums greatly improves student performance. However, the study also cautions that for effective integration to occur, computers must be used to engage students and encourage critical thinking. Implementing tools that shift focus to student-centered learning have been found to have the greatest possible effect. Many available technologies allow teachers to engage students with the curriculum while empowering them with choices in the learning (Schacter, 1999).

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Developing Effective Teaching Skills Through the use of Instructional Technologies

Nikki L. Conklin,Ph.D.,Team Leader, Training and Development and Associate Professor
Conklin.1@osu.edu

R. Warren Flood. Graduate Administrative Associate
Flood.13@osu.edu

Linda M. Kutilek, Leader, New Personnel Development and Associate Professor
Kutilek.1@osu.edu

Jo M. Jones, Ed.D., Leader, Learning and Leadership and Associate Professor
Jones.20@osu.edu

Walter Warkus, Television Producer, Communications and Technology
Warkus.1@osu.edu
Ohio State University Extension, The Ohio State University, Columbus, Ohio USA

Abstract: OSU Extension, as the outreach arm of The Ohio State University, has traditionally addressed the need to enhance teaching skills among its program personnel via face to face in-service training. With approximately 900 educators located in 93 field offices, the OSU main campus and at numerous research centers, providing training to meet individual needs at a teachable moment is challenging. Through the development of an experientially based multi-media program *Enhancing Teaching and Learning Dynamics* , the authors intend to individualize instruction. This paper session will share the development of the program and highlight how instructional technology was used in conjunction with localized coaching and feedback activities to develop a skill enhancement program.

Introduction

To remain viable in today's high touch informational society, formal and non-formal teaching in higher education must incorporate computer-based instruction. Educators must keep up with the technological revolution that has restructured how people access knowledge.

Teaching effectiveness and instructional strategies take on new dimensions when teaching via distance education methods. Those who are comfortable teaching in face-to-face environments are facing challenges requiring new approaches to teaching and learning. Teaching strategies highly effective in group settings may not enhance learning when the learner is sitting in front of a computer in the comfort of his/her home or office.

The Extension Employee Development Network at The Ohio State University provides training for employees on effective teaching as well as assisting with teaching components for undergraduate/graduate classes on teaching strategies, adult learning, and incorporating critical thinking into learning environments. The OSU Extension faculty who are major recipients of the Employee Development Network's teaching are hired for their subject matter expertise. These employees may not have education degrees or experience in teaching, yet their major role is that of educator/teacher. Therefore, it is imperative that these 900 plus employees receive effective teaching training so they in turn can teach learners throughout Ohio.

The Employee Development Network has traditionally taught effective teaching courses/modules in face-to-face group settings. Four members of the Network decided the time had come to revamp this teaching experience in alignment with high tech teaching strategies. A multi-faceted approach was used in the development of this individualized "effective teaching experience". The "experience" includes a computer-based training/teaching module (web-based or a CD), on-line learning partners, concept

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integration through teaching and facilitated learning, coaching and observation, and advanced training and in-service offerings. The experientially-based multimedia resource CD includes video references, text information, hyper-linked text, video/text/audio examples of implementation methods, pretest/posttest evaluation instruments, comparison log template, and application exercises.

The quality of teaching and learning cannot be compromised when using computer-based training. Teaching and learning principles and theories are just as critical in high tech dissemination of information as it is in high touch learning environments.

Constructivist Learning Theory and Instructional Design

The authors have focused on "constructivist learning theory" as a theory appropriate for guiding instructional design projects that are computer-based. According to Bencze (1999) constructivism emphasizes the mental building learners seem to do when they learn. The theory relates to the gestalt way of thinking that the whole is more that the sum of its parts. In the field of management this idea is referred to as synergism. Learning, from the bringing together of various input from different parts of our lives, suggest the need for active versus passive learning.

The authors of this paper were also the designers of the aforementioned multi-media experience on effective teaching. Their operational definition of constructivism was:

> ...a philosophy of learning that subscribes to providing learners with active learning processes that provide experiences, collaborative activities, shared discourse and reflection that encourages the learner to assemble, build and/or construct their own and a shared knowledge base. Thus, providing the learner an opportunity to take the knowledge gained through these active learning processes and extend it beyond what was presented. (Bencze,1999)

Following are critical instructional design principles that support a constructivist learning theory. These support the writings of Rosenburg (2000).

- educational goals must motivate and compel the learner;
- program activities/exercises must focus on learning by doing;
- learners need to perceive that the educational environment is one in which it is safe to fail;
- coaching and feedback strategies are a critical component;
- examples of modeling by experts are provided as part of the experience;
- authentic case studies and scenarios are furnished for a realistic perspective;
- the product affords opportunities to apply/reuse information after learning occurs;
- interacting with the program sets the stage for the learner to bridge "real life" experiences with the learning.

Experiential learning theory is compatible with active learning and constructivism. Kolb's (1984) four components of experiential learning include:

1. Concrete experiences including sensing and feeling
2. Reflective observation also referred to as watching
3. Abstract conceptualization involving thinking
4. Active experimentation or stated also as doing.

Whether teaching credit courses, providing in-service training for extension faculty and staff who teach community-based non-formal courses, or conducting effective teaching workshops for college professors or graduate teaching assistants, faculty must be on the cutting edge of technology. With every passing year, many learners arrive with more and more high tech literacy. The younger generations in the workforce are described as "cyber literate" and "techno savvy" (Salopek, 2000). Training programs and learning experiences must catch the attention of those who grew up with the glitz and glamour of videos, MTV, computer games, and learning from high tech/interactive toys.

The higher education students/learners of the future who will have entirely grown up in the digital age will have a tremendous edge on information technology. Alch (2000) said in reference to the net generation "they're comfortable with changes brought about by new technologies and e-

commerce...they're conversant with a communications revolution transforming...education...and every other institution" (p.32). Are teachers of higher education ready to teach this new generation?

Dunerstadt (1999,p.12) would say that if we are not ready, we had better get ready. In Katz's book *Dancing with the Devil*, Dunerstadt says:

> The classroom itself may soon be replaced by more appropriate and efficient learning experiences. Indeed, such a paradigm shift may be forced on faculty by the students themselves. Today's students are members of the "digital generation". They have spent their early lives surrounded by robust, visual, electronic media...unlike those of us who were raised in an era of passive broadcast such as radio and television. They approach learning as a "plug-and-play" experience...inclined to plunge in and learn through participation and experimentation. Although this type of learning is far different from the sequential, pyramidal approach of traditional college or university curriculum, it may be far more effective for this generation, particularly when provided through a media-rich environment.

Enhancing Teaching and Learning Dynamics Program Overview

The authors of this paper have applied constructivist theory and experiential learning models to design a multi-faceted, individualized "effective teaching experience" called *Enhancing Teaching and Learning Dynamics: Individual Support for Extension Educators*. Starting with the concept of a single computer-based training CD, we have now expanded the package into a full-scale training module consisting of a set of interactive multimedia CD's and four other fundamental components. These components include coaching activities facilitated by experienced Extension educators, an on-line learning partners web-site, concept integration through teaching and facilitated learning within the responsibilities of an Extension educator, and advanced in-service offerings. Each CD within the resource set contains an introduction and a menu of its contents so that an individual may create his/her own path of exploration as a self-determined learner. The CD also includes video/text/audio presentation of content, printable text-based materials, hyper-linked text of key terms and concepts, examples of implementation techniques, tips on concept integration, evaluation instruments, a journal for self-reflection, interactive application exercises, checklist and form templates, reference lists, and a link to an on-line resource site. Figure 1 illustrates the relationship of each program component to Kolb's (1984) experiential learning theory and Rosenburg's (2000) instructional design principles. (Figure 1 attached)

Best Practices for Effective Educational Design

One of the side benefits from the creation of the computer based program on effective teaching is knowledge gained relating to the "how to's" of designing educational experiences that are computer or web-based. The authors offer the following advice to other educators who are ready to accept the challenge of designing a computer-enhanced learning experience:

> Make it a team effort that brings together expertise in the subject matter being taught, expertise in educational design and expertise in computer-based programming. If any of the three areas of expertise is missing, the quality of the end product will be compromised.

> Learn from others' experiences by accessing other educational computer programs. Try out the activities and make a list of the techniques/strategies you like and dislike. Have colleagues interact with the program and make a list. Compare the lists of likes/dislikes and then decide which would be appropriate for your project.

> Engage the assistance of a "sounding board" comprised of people who are representative of the end users. Have them continuously interact with the evolving program and give feedback as a type of formative evaluation.

Include a variety of learning activities that meet the various needs of your learners. Ask yourself if the training is tailored to different learning styles, or are you trying to make one size fit all (Goldberg, cited by Salopek, 2000).

Stonecipher (2000) poses the question and answers it—" will the introduction of new technology present any threat to traditionalists? Of course it will...we need to make sure that we are on the winning side of new technologies" (p.3).

A Challenge to Educators

Many in higher education are indeed traditionalists. Some educators will feel threatened but many will rise to the challenge of integrating new technology strategies with their current teaching methods. For those who do not rise to the challenge, they may retire from the "ivory tower" never having 1) provided feedback to a student via e-mail; 2) given a grade to a graduate student they have never met; or 3) engaged in a debate through a chat room with students from nine states and four countries. The time is right for experimenting with learners. Higher education must rise to the occasion.

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Collaboration between University and Schools in the Appropriate Use of ICTs in Teaching and Learning.

Iolanda Bueno de Camargo Cortelazzo
Doctor in Education, Teacher in the Pedagogy Course and in the Graduation Program in Education and Researcher on ICTs use in Education at Universidade Tuiuti do Paraná , Brazil
iolanda.cortelazzo@utp.br icortel@attglobal.net

Abstract: This research investigates what teachers think of and how they use ICTs in their teaching practice in Higher Education and proposes collaborative projects to make teachers more prepared and updated to optimize their students learning through the appropriate and effective use of ICTs. But this research does not focus only the operational aspects of ICTs. On the contrary, it starts from the point that the knowledge of the history of technology and the appropriation of the use of ICTs can permit teachers to understand the impact ICTs have on their actions, on their own development, on students learning styles and process. Since ICTs are intensively present in the society in which teacher and students live, both in Higher Education have to discuss how ICTs affects society and think of ways to control and regulate them in favor of a sustainable life for the human kind.

Introduction

In Meetings, Conferences and in teacher empowering courses, you become aware that there are a number of graduated professionals from Human Science and Teacher Colleges working in a different area not related to the courses they had attended. Many continue in the same function they had occupied before taken their Higher Education Courses. Others are unemployed. One of the reasons they present is that they do not correspond to the labor market need either because they do not have experience or because they do not master the *I*nformation *C*ommunication *T*echnologies, *ICTs*.

Recently, private educational institutions and the human-resource departments in the companies, in any level, have been more demanding in choosing new employees for training functions as well as for teaching, administration and coordination. They demand competence and proficiency in the use of ICTs either as distance or face-to-face instruction,

On the other hand, there are many non-academic courses that teach just operational instructions in the use of computational applications and systems as if all ICTs were just operationally relevant

There are no care with the orientation of how, when and why to use the ICTs in Education and in the professional development at school, at the University or in-service. There is no study of the history of technology and as it outcomes from specific political and economical issues. There is no reflection on the use of ICTs as collaborative technologies that promote collective intelligence, creativity and teamwork. They do not prepare teachers to the use of ICTs in Distance Education, favoring the relationship among peers and the interaction among students beyond the school walls. They do not even preview negative consequences which could come from the inadequate use so they could prevent or minimize them.

On the other side, state and city public schools receive principals, coordinators and teachers selected in public contests which do not preview the competence verification neither in the use of ICTs nor in the collaborative work. Therefore, most of the school professionals do not have competence and proficiency in the use of ICTs and they do not know how to introduce them or implement their use in their schools. Most of these professionals use them as tools individually, without realizing their potentiality as collaborative tools enhancing creative and efficacious team work, besides optimizing their individual work, their research and their personal development.

Based on the project "Quality in public teaching and teacher formation", at USP, São Paulo and on my own experience in teacher development courses, besides the production of knew knowledge in the field, this research can bring relevant contribution for the Pedagogy curriculum to improve teacher development, to satisfy the needs in this professional field as well as to fulfil a social function in the community.

Theoretical Fame

The teacher responsibility in the construction of a communication society can not be limited to the acceptance of the technological determinism that technology will master more and more the society, restricting its liberty, making it automated and controlled. Teachers must see the ICTs as mind extensions which can enhance the human creative, sensorial and cognitive capacity.

Large computerized databases permit information storage, classification, selection and retrieval in ways which were impossible to be manipulated by human being's memory.

The simulators amplify the imaginative capacity while the virtual reality amplifies the perception, enabling the virtual manipulation of dangerous experiments.

Telematics, integration of telecommunication and informatics, decreases space and time barriers and permits the development of a creative collective intelligence (Lévy, 1996). It creates conditions to access virtual libraries and the realization of projects with partners of institutions in other regions of your country and/or abroad. It also enables teachers and students from public schools to share projects. Finally, telematics optimizes the existing technological infrastructure if teachers are well prepared to its appropriate use.

Artificial Intelligence permits people to work with enormous databases and elaborate projects taking decisions much more rapidly and accurately.

We, teachers, are responsible when we make up our minds to act, or not, to develop in our students a criticism in using ICTs, putting them to the service of the society through a collaborative collective action to produce new social scenarios and new humanizing knowledge.

Instead of seen them just as tools which substitute or make human beings slaves, we can "make them tools and instruments which give freedom to people and social groups" (Martin, 1997:14). Autonomy and competence to search and retrieve information in communication networking will permit teachers and students to experience the permanent exercise of communication and information.

This experience, done through the manipulation of the ICTs, must be integrated to the curriculum not as a simple operational action, it must be embodied as a resource, as study object and as educational agents.

Lévy (1998), Martin (1999), Postman (1996) point out the danger of people to be drown in an information ocean if they are not prepared to look for information with selection and value criteria. As Postman syas (2000:170), schools have to be worried with those psychological, social and political effects technology impose. Thus, it is urgent for us, teachers of teachers, to prepare a "technology education" and to organize our courses with time and space for reflection so we can develop, in our teacher-students, concepts, attitudes and skills to analyze both the use of ICTs and if the collected information ethic they work with is true, relevant and.

It is essential for students and teachers to realize that people can be emitters, authors and agents and the ICTs are media for them to learn, work, have fun, create, communicate and collaborate interactively.

When teachers become effective and reflecting ICT users, they will realize they can help to improve student learning efficiency. It is not enough to introduce activities mediated by different technologies, it is fundamental that teachers experience technology in their own development as a mediator of information search, selection and retrieval and in the communication with their peers, their students and the community where they live in. Using ICTs as other means to do research and to communicate, the teachers will certainly be able to work with them, awake their students interest and guide them in the mastering and controlling process of ICTs for their own growth.

Research

This research is an experimental action research in the sense that it tries to produce new knowledge from the investigation of a present situation and proposes an educative action from the results of this investigation getting along with it and assessing its process and outcomes.

At first, the investigation diagnoses if the 1998-to-2001 graduated teachers from UTP Teacher College have enough knowledge of the ICT educational and teaching potential as well as it collected data to characterize the social contexts and the teaching contexts where they have been working. They answered a questionnaire and attended a lecture "ICT Mediation in Education" to sensitize those who were still resistant to ICTs and to bring updating information to those already familiar with them.

This research investigates also the functions which the 1998-to-2001 graduated teachers from UTP Teacher College have been carrying out using ICTs, their competence in using them as collaborative tools, or other educational uses people make of them.

Teachers graduated in the years 1998, 1999 and 2000 did not have any preparation to use ICT in education during their under-graduation course. "ICTs in Education" as a discipline in the Pedagogy curriculum was introduced at UTP Teacher College in 1999 (those classes graduate in 2001). So it is possible to compare their competence, to know if they had any kind of instruction in using TIC in their professional life and how it works in their teaching practice.

Collected data will permit to plan and execute a 60-hour empowering course aiming to the reflecting teacher formation, adopting the collaborative educational action approach with individual projects interlaced with community and school collective projects. The teacher-students in this course will write a brief history of technology and work with ICTs as different forms of representation and communication and as mediators of a renewed and transforming education for a society with more equity and solidarity.

Since most in-service teachers cannot come back to University to study, a Distance Education program can provide them an environment to learn, discuss and reflect on the collaborative use of ICTs in education.

The research also brings necessary information to improve the curriculum of Pedagogy at Teacher College so that under-graduate students can experience ICTs, collaborative team work along their course as well as transfer what they will have learned to their teaching practice.

Partners

In parallel, ICT companies have been contacted to start a partnership with the University to promote a support to teacher continuing education in the use of ICTs. It is a trend to bring the enterprise to develop partnerships with schools to fulfill their social function. The research contributes with new knowledge on the use of ICTs that can be shared in the companies. It is a multiple-way partnership. The research gets funds, the enterprises get knowledge, schools get qualified teachers, teachers become competent and proficient and their students, in consequence, have better teaching.

Conclusion

Finally, this research has as basis that the focus must be on the students learning, never on the ICTs, but the teachers go on being the key for teaching and learning. Then, for the success to happen in education, dedicated and true teachers must be empowered by both studying and updating their knowledge as well as their use of ITCs. As they transefr their knowledge to their practice, a constant discussion and evaluation have to be held. As a parallel outcome, a new experience in working with face-to –face and distant courses will be created and evaluated as it goes on.

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Web-based Multimedia for Educators Course

Caroline M. Crawford
University of Houston-Clear Lake
United States of America
crawford@cl.uh.edu

Abstract: The instructional design that is imperative towards the design and development of a Web-based course environment is of primary consideration when a graduate-level course is the focus of attention. Further, a multimedia course that incorporates the theoretical as well as hands-on elements that must be consistently focused upon and updated is of further concern. What is the most productive way to constantly maintain the most recent knowledge within the multimedia genre, as well as offer a wide scope of multimedia environments through which to offer the learner a full scope and sequence of curricular events? The analysis, design, development, implementation and evaluation of two significantly distinct Web-based learning environments will offer a clear progression through the initial instructional design phase, clear feedback offered by the learners which drove the second instructional design phase, and the results of the second implementation and evaluative efforts pertaining to the course.

Introduction

Within the revisionist's redesign of the course, the curricular scope and sequence shifted, the access to the knowledge and interactive elements shifted, the flow of the course significantly changed and the learner's feedback on the newest course structure is intriguing. Educators must have the opportunity to delve into the graphic design basics, pertaining to textual layout as well as the importance of using type styles within distinctly different environments, have a clear understanding of instructional design basics, focus upon flowcharting and storyboarding a multimedia product, remain sensitive to human/computer interface issues, and remain closely tied to the formative and summative evaluation stages of the development stage. Further, a shift in the Web-based mentality impacted the outcomes of the learner's level of understanding through out the course; this Web-based versus Web-enhanced structural shift offered opportunities to the learners that eased self-regulation issues as well as community-building concerns.

History of the Multimedia for Educators Course

The graduate-level Multimedia for Educators course had historically been taught by adjuncts within the specialization area; therefore, there was no significant standard in place for the course's instructional design. When the author became a member of the Instructional Technology team and took the responsibility to standardize and maintain the course, a significant shift towards meeting the International Society for Technology in Education (ISTE) standards (International Society for Technology in Education, 2000; International Society for Technology in Education, 2001) was continuously integrated, implemented and updated.

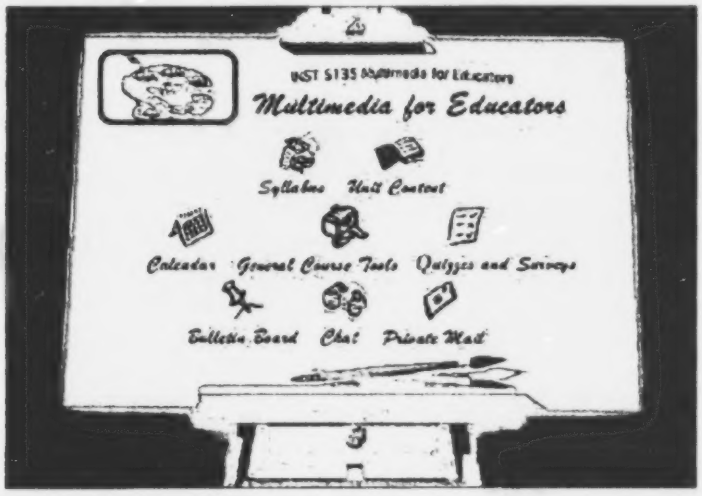
As the standardization process for this course was under way, the university developed a plan of action towards the support of the World Wide Web-basing of coursework. The instructional technology specialization area was one of the areas focused upon as an initial area of focus; therefore, the Multimedia for Educators course was one of the initial courses chosen to Web-based. As such, the course structure was as follows:

- Course Introduction
- Unit One: Introduction to Multimedia
- Unit Two: Developing Multimedia – The Basics
- Unit Three – Designing with Images

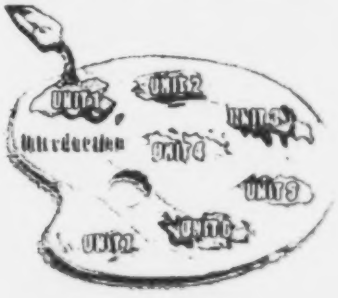
- Unit Four: Designing with Type
- Unit Five: Linear/Asynchronous Media
- Unit Six:: Nonlinear/Synchronous Media
- Unit Seven: The Future of Multimedia

Each of the course units maintained their own separate unit objectives, which directly identified with the course objectives that were previously identified through the Texas Essential Knowledge and Skills (TEKS) (TEA, 2001) and ISTE standards (International Society for Technology in Education, 2000; International Society for Technology in Education, 2001).

The course interface created a metaphoric representation so as to aid the learner towards the conceptual framework development and understanding. A metaphor surrounding the creative artist metaphor was decided upon, as multimedia is an artistic form of expression that integrates instructional design, imagery, designing with type, video, audio and numerous other interactive entities. Following is the initial interface for the course:



The artistic metaphor was simulated from the home page of the Web site. As the course was developed using a packaged course development software, the iconic representations were integrated from the course development software. Further, the course metaphor was further integrated through out the course structure as image maps simulated in the unit overview section of the course:



The course layout was one wherein all the textual and graphic information was scripted using HyperText Markup Language (HTML) so as to fit within the confines of the packaged course development software, as well as take advantage of the interactive activity capabilities available. Each of the seven Units of Instruction, as well as the Introduction and Syllabus sections, consisted of seven to fifteen pages of

instruction that the learners needed to access. Within the pages, there were numerous hypertext links to either interactive activities or outside-of-course hypertext links to Web sites of importance.

Concerns With Original Instructional Design and Layout

The feedback from the learners was mainly positive, as the Web-based course was given to numerous hours of thought and planning before any specific design or development was undertaken. Following are the aspects that the learners noted as being positive within the course structure:

- Course metaphor
- Units of Instruction were color-coded
- Navigation
- Unit of Instruction overviews
- Unit objectives
- Unit Summaries
- Table of Contents at end of Unit of Instruction
- Clearly delineated assignments
- Clearly delineated assessment rubrics for each assignment

However, there were a few areas within the original course that the learners noted as being either difficult or negative aspects:

- Amount of information that the learners needed to review
  (As an aside, the learners printed out every Unit of Instruction page for ease of review)
- Some hypertext links to outside Web sites were "dead" links

As these negative aspects were serious considerations for the course instructional designer, the course was revised the following semester.

Revisions to the Course

Revisions to the Multimedia for Educators Web-based course were undertaken over a semester's time period. Several significant shifts in the instructional design and interactive layout were to occur and a significant period of time was necessary in order to accomplish this. Following are the changes that the course embarked upon:

- Shift the Units of Instruction
- Revise the Online Quizzes
- Change each of the Unit of Instruction's Layout
- Integrate the instruction within each Unit of Instruction into a downloadable Portable File Document (PDF)
- Integrate audio downloads
- Integrate video downloads
- Integrate PowerPoint presentation overviews for each Unit of Instruction

Following are short explanations of the above revisions to the Web-based course, so as to further emphasize the necessary elements under consideration.

Units of Instruction Shift

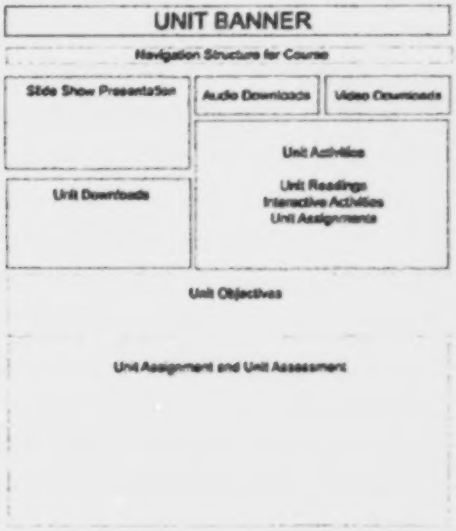
The instructor desired to integrate a more advanced multimedia software package into the course which, therefore, mandated a shift in the instructional design of the course. Following is the revised course structure:

- Course Introduction
- Unit 1: Introduction to Multimedia – The Basics
- Unit 2: Designing With Images and Type
- Unit 3: Multimedia into the Learning Environment: The Instructional Design Process
- Unit 4: Linear/Asynchronous Media
- Unit 5: Nonlinear/Synchronous Media
- Unit 6: High-End Multimedia Environments
- Unit 7: The Future of Multimedia

Some of the previous course elements were integrated into one Unit of Instruction and additional Units of Instruction were added, such as Unit 6: High-End Multimedia Environments. Further, the knowledge-level online quizzes for each Unit of Instruction were revised to reflect the shift in subject matter.

Unit of Instruction's Layout Shift

The layout for each Unit of Instruction was meant to allocate more space to the areas of greatest importance within each Unit, as the majority of the instructional information would be included within the Portable File Documents (PDFs) for each of the Units. Following is a simplistic layout example for a generic Unit.



Each of the Units of Instruction included each of the elements included in the layout delineated above. Therefore, the significant difference between each of the Units of Instruction would be the color allocated to each Unit of Instruction, as well as the Unit Downloads and Unit Activities made available. Further, the Unit objectives and Unit assignment and assessment rubric would be available for the overview of each Unit of Instruction. As well, each of the Unit of Instruction slide show presentations, audio and video downloads would be appropriate to the Unit in question.

Portable File Document (PDF) Instruction Access for each Unit of Instruction

Each Unit of Instruction consisted of its own portable file document (PDF) that organized the unit knowledge into an appropriate instructional design format to emphasize the materials to be integrated into the learner's knowledge base as well as to designate the interactive activities that would offer the opportunity towards higher order thinking skills. The PDF format was chosen due to its portability factor and the ability to designate a page layout for each presentation of the content. The content contained within

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the PDF document offered an ease of instructional shift for the faculty member due to the lack of HTML scripting that was previously necessary. Quickly changing the document, saving it as a PDF, and uploading the file to the server was all that was necessary to revise the course content.

Integrate PowerPoint Presentation Unit Overviews, Audio and Video

Each Unit of Instruction offered a PowerPoint presentation as a Unit overview, as well as audio and video files of the instructor stating the main objectives of the Unit. The audio and video files were meant to test the perceived learner-instructor relationship that occurs within a face-to-face course yet may not occur to as great an extent in a Web-based course learning environment.

Learner Feedback

The new layout of the course was tested the next semester, with student feedback noting significant elements of interest:

- The High-End Multimedia Environment integrated into the course, although significant support information was available to the learner, was overwhelmingly disliked due to the steep learning curve over a short allocation of time. The learners noted a desire that a high-end multimedia environment with a less steep learning curve be considered as a replacement.
- The students stated their approval towards the PDF documents for each Unit of Instruction. They noted that it was easier to print out the information, if desired, as well as the portability factor was desirable when they moved from computer to computer through out their daily activities. They disliked accessing the course Web-based site constantly for other courses and enjoyed the ability to manipulate their learning environment through the portability of the PDF documents for each Unit of Instruction.
- The students noted a lukewarm attitude towards the slide shows available for each Unit of Instruction, although they all noted that they reviewed each one available for each Unit. The audio and video files were not available at the time of review, so the learner feedback was unavailable for the audio and video file level of success.
- The students stated that they strongly supported the "cleanliness" of the Units of Instruction. The layout was easy to access and review, as well as printing out the information available aided them in their motivation and time allocation.

Conclusion

The instructional design that is imperative towards the design and development of a Web-based course environment is of primary consideration when a graduate-level course is the focus of attention. The interactive elements of a Web-based course is also of significance through out the instructional design process with the focus being allocated towards the learning environment, the ease of information and activity access, and the clear layout of each Unit of Instruction.

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Online and Onsite Action Research: A State Wide Professional Development Model

Nedra A. Crow, National University, San Diego, CA, USA, ncrow@nu.edu
Michelle Bachman, Salt Lake City School District, SLC, UT, USA, michelle.bachman@slc.k12.ut.us
Betty Spencer, Davis County School District, Bountiful, UT, USA Bspencer@curric.dist.davis.k12.ut.us
Ann Adams, Davis County School District, Bountiful, UT, USA eaadams@curri.dist.davis.k12.ut.us

Abstract: This paper is a description of a collaborative state-wide action research professional development program. The program centers around an action research course that employs a variety of distance education delivery strategies, including a newly developed and innovative online course. The purposes of this paper are to: 1) outline the local action research program and its instructional and collaborative principles, 2) illuminate the state-wide collaborative efforts and organization, 3) describe the distance education delivery strategies, 4) outline the online course, and 5) discuss preliminary findings.

Action research or teacher research is a form of reflective practice based on the principles associated with systematic inquiry of one's own educational practice. Historically, action research was embedded in social action and critical perspectives required to illuminate issues of curriculum and the social structure of schooling. Throughout the decade of the 1990s, action research, and its various forms of participatory inquiry began to emerge in graduate programs and higher education focused professional development endeavors. However, in recent years, action research has become an increasingly popular form of K12 professional development (Licklider,1997; Lytle and McGuire,1993). Its popularity can be noted in K12 staff development guides, school reform efforts, and workshops (Halsall,1998; Harris, 1998).

The popularization of action research has created challenges for educators who believe that this model of professional development is, by its very nature, different from the more traditional forms of training, workshops, and inservice education. As action research has expanded into the arena of district promoted staff development (Kochendorfer, 1997; Lytle, 1996), there is a tendency to reduce its conceptual, instructional, and contextually-driven frameworks into more discreet packages of "how to" or "tidy tips" approaches demanded by overworked and highly-pressured classroom teachers. Furthermore, there is the tendency to promote locally driven, collaborative and successful programs to a larger audiences. The challenge here is to keep to the pedagogical and collaborative tenets vibrant as more distance education strategies are employed in the ever expanding dissemination process.

It is within this changing world of professional development and action research, that a local and collaborative action research program evolved into a large dissemination project. The question before the developers of a local action research program called ULEARN (Utah-Local Eduators Action Research Network) was, how do you deliver a state-wide professional development program and maintain the instructional quality and collaborative nature that framed a successful local program? The purpose of this paper is to: 1) outline the local action research program and its instructional and collaborative principles, 2) illuminate the state-wide collaborative efforts and organization, 3) describe the distance education delivery strategies, 4) outline the online course and 5) discuss preliminary findings.

The Local Effort and Guiding Principles

Building upon years of instructional and evaluative knowledge about the role and design of a successful graduate action research program (Crow, Stokes, Kauchak, Hobbs, and Bullough,1996), a professional development effort was initiated in 1994 by four teacher educators from the University of Utah, Davis, Granite, and Salt Lake City School Districts. The teacher educators represented one full-time faculty member and three University/District Liaisons (half-time at the University of Utah and half-time in their respective district's Staff Development Offices). The goal of this collaborative venture was to design and implement a high quality professional development course for K12 educators using an action research model (Crow, Adams, Bachman, Peterson, Vickery, and Bernhardt, 1998). The subsequent course and

U-LEARN (Utah Local Educators Action Research Network) program was developed and infused with six guiding principles that grew out of the work by Judith Warren-Little (1993). U-LEARN principles are:

1. Professional development should be educator-centered and context-specific.
2. Professional development is sustained within a community of learners focused on studying and discussing teaching and schooling practices.
3. Professional development should allow educators the opportunity to generate meaningful and passionate questions and pursue those questions within an atmosphere of support and knowledge of the action research process.
4. Action research should encourage a variety of "ways of knowing" that are useful to each educator
5. Learning the action research process requires sustained instruction by competent teachers, application of knowledge and skills by interested educators, and a community of learners involving participants and instructors.
6. Action research is both exciting and painful. There are no right, common or easy answers. The process is "messy" and intriguing. The teacher empowerment is breath-taking.

The first course was taught in 1995 to 30 K12 teachers and administrators in the three participating school districts. Taught onsite in various schools, the participants and instructor met for 90 minutes every week during a seven month period. Taught every year, participation in the six-credit semester course grew rapidly to 80 educators in 1998. By 1998, a consortium of seven rural school districts in central Utah called CUES (Central Utah Education Service area) approached the U-LEARN instructors with a proposal to provide the same course to their educators. The CUES course employed the state's two-way audio and video conferencing system (EDNET) to create weekly teaching sessions broadcast to five rural districts locations. Additionally, the course implemented four onsite teaching sessions in two locations. In September of 1998, the CUES distance education program was delivered to eight selected educators who then became onsite facilitators for future CUES action research courses. By May, 2000, the CUES course had successfully taught an additional 35 educators in these rural school districts.

State-Wide Collaborative Efforts and Organization

By late 1999, the four University of Utah teacher educators/course instructors were approached by representatives from the Utah State Office of Education and, a large K12/higher education consortium called the Brigham Young University Partnership. In a series of meetings, a state-wide action research professional development program was developed called the Action Research Initiative.

In order to create a locally and contextually driven program directed by collaborative efforts and centered in communities of learners, the Initiative organized the state of Utah into seven regional areas (see www.ed.utah.edu/ulearn). Each of the seven areas were represented by a local regional director (K12 administrator), one of the four University of Utah (UU) instructors, and a cadre of urban and rural assistant instructors called Lead Instructors. The coordination needed for recruiting participants was lead by the regional director and supported by the UU instructor. Financial resources were supported from Goals2000 Grants, directed by the UU instructor, and housed in the region's school district.

Presently, five and of seven regions are active participants in the Initiative efforts. The five regions include eighty percent of the urban Wasatch area (two regions: BYU Partnership and Utah Education Consortium consisting of the University of Utah and five local school districts) and three rural consortiums (including 20 rural school districts).

Distance Education Delivery Strategies

From the beginning of the U-LEARN program in 1994, the four University of Utah (UU) faculty members framed their efforts and course instruction with the guiding principles of action research and coupled them with the following instructional quality indicators: sound theoretically framed content, high

instructional touch, classroom relevance, teacher empowerment, and appropriate academic rigor. The challenge of the Initiative program was to keep these guiding principles and instructional indicators front and center while employing more distance education and technologically-based approaches. To do so, the foci of the distance education delivery strategies were high tech and high touch. In order to achieve these goals, several key distance education strategies became integral Initiative program elements.

The first element was the instructors. Each region was directed by an University of Utah instructor. Each instructor worked with 3-6 Lead Instructors. The Lead Instructors were selected from K12 educators who had either completed a Masters degree with an emphasis on action research or completed years of U-LEARN course participation. Furthermore, Lead Instructors were selected because of their ability to work with adult learners, demonstrated proficiency in the action research process, and work in their own K12 classrooms. The UU and Lead Instructors worked with regional participants during the onsite teaching sessions and acted as "online course coaches" to those same participants.

The second distance education element was the onsite teaching sessions. The sessions were taught in each regional area. Because of the large geological area, two teaching sites were designated within each region. While the four onsite sessions covered content represented in the online course, the sessions also provided an opportunity for instructors to meet with participants. Personal contact was important for several reasons. Firstly, most participants were new to the online course environment, therefore, anxiety and confusion were high, particularly during the initial months of the class. Secondly, the action research process was a new venture for educators, requiring them to systematically study their own teaching and classroom practices. As a result, the action research process can be considered, a "messy" venture involving ambiguity, questioning, and methodological refinement. These unsettling perspectives often require high touch strategies. Therefore, the onsite teaching sessions became a salient aspect.

The third element was the online course. The online course was developed as a self-sufficient, stand-alone course. However, for the Initiative efforts, the course became a significant enhancement to the four onsite teaching sessions.

The Online Course

Prior to the 1999 call by educators for a state-wide action research program, the University of Utah instructors believed that an online course component was needed to encourage their distance education efforts for the ULEARN program. The online course built upon the curriculum, instructional strategies, and evaluative feedback gained from years of onsite course implementation. The four UU instructors secured funding to design the course with a corresponding website from a 1998 Goals2000 Grant. With grant funds in hands and a curriculum ready for online enhancement, a UU agency dedicated to technology driven applications, called Media Solutions was hired to migrate the course to Learning Space. It should be noted that Learning Space was selected for this project because it was already available to the course designers at no further cost. Additionally, the grant paid for Web Server maintenance through the College of Education and technical support staff.

The online course was designed to teach and apply the action research process to educators' professional lives by linking the online instructional experiences to their classroom activities. The course was activity-based and field focused. The course employed asynchronous instruction along with directed field assignments and projects, links to the relevant resources, threaded discussions, reflective assignments, journal entries, regional threaded discussion groups, "study-buddy" pairings, links to database reference systems, chat room, and collaborative learning space interactions.

The online course curriculum organization is nested. There are 11 Units. Within each Unit are Modules. Finally, within each Module are Activities. Each Unit and Module is composed of an Overview Statement that introduces the participant to the upcoming content, goals, expectations, and instructional activities.

Media Solution personnel created an online version as well as a hard-copy Participant Guide that served as a "how to" module able to teach beginning and advanced Internet users about: accessing the

Internet, navigating the website, accessing asynchronous activities, and participating in electronic conversations.

Preliminary Findings

September 2001 signaled the start of the pilot year for testing the program organization and the distance education strategies, including the newly developed online course. Presently, there are almost 60 participants located in urban and rural Utah. The course is lead by four University of Utah adjunct faculty members and 17 Lead Instructors working in potentially 30 school districts. The start dates for the course varied by region. One region (CUES) began in September 2001. Three other regions started October/November 2001 (Central Wasatch, NUES, and SEDC). Finally, the BYU Partnership started January 2002. All course participants will complete their action research projects in time for the 1 May 2002 ULEARN Conference. At the conference, participants will share their action research projects with other course participants and invited guests.

Based on observations, informal interviews, field notes, and document analysis our preliminary findings focus on four major themes: 1) the online course development, 2) overall course development and implementation, 3) Lead Instructors, and 4) collaborative process.

Online Course Development: Developing an online course that stayed true to our original, course pedagogical and content principles were a challenge. Most online course software packages are not designed to be activity-based, content applied, and field focused. Most online courses are designed around reading the content, participating in threaded discussions, using the chat rooms, and completing written assignments. Our action research course was and is based on immediately applying learned principles to the field settings of the K12 classroom or school. Furthermore, action research and the inquiry process requires sustained application, reflection, revision, and re-application through instructional directed activities and coaching. Much of the "learning" of the action research process occurred because participants and instructors worked together and through ambiguity and frustration. Designing an online course environment to facilitate and lead participants in a field-driven and applied learning seemed daunting at times, yet always a necessity. The Media Solutions personnel were extraordinarily bright and creative as they adapted a rigid software into an activity-based learning environment.

Overall Course Development: Using the online course as an enhancement to the onsite teaching sessions has helped to create and maintain the sense of community, lessen participant anxiety, and ensure instructor comfort. The onsite teaching sessions became invaluable in introducing the participants to the technology, the action research process, and instructional personnel. While the online environment assisted in developing personal contact through a somewhat anonymous medium, the face to face interactions added a much needed warmth and connection our K12 educators were accustomed to through their more traditional professional development classes.

Lead Instructors: Facing the prospect of teaching and traveling to the entire state of Utah meant that the four, already full-time employed instructors would need to be working two full-time jobs. This was not acceptable nor possible. Therefore, the conceptual formation of the Lead Instructors and actual selection of them made the Action Research Initiative possible. Furthermore, the Lead Instructors formed an additional, and important layer to the community of learners created by the four instructors. As a group, all the instructors struggled with and learned the Learning Space software. Moreover, the Lead Instructors became a valuable feedback resource as the course was designed and migrated to the online medium. The Lead Instructors' feedback guided the development and content needed for the Participant Guide.

Collaboration: Collaboration was messy and difficult, at best. Every aspect of the ULEARN program, Action Research Initiative, and online course was the result of collaborative efforts. The original U-LEARN program and onsite course were developed by personnel forming a university-school district partnership. The program was created to serve the needs of K12 educators, district staff development, and higher education. The state-wide Action Research Initiative was developed through partnership endeavors on the local, regional, and state levels. The Initiative required state leadership and resources while the program implementation was driven by local concerns. Finally, the online course was developed from

several perspectives, including; the four university faculty designers, Media Solutions online and web expertise, and feedback from Lead Instructors as well as participants.

While the collaborative piece sounds neat and tidy, it was not so. Collaborative efforts required detailed planning and fluid philosophies to accommodate shifting stakeholder needs. The best of intentions were often met with changed agendas. Concerning the online course, close and continued interactions, evaluative feedback sessions, and shared development time was required between the primary course designer and software migrator. As a result, the online course development timeline moved from an initial estimated three months to over 20 months.

While the online and onsite course began a few months ago, work on the state-wide Action Research Initiative has been ongoing for over two and half years. Much has been learned, refined, changed, enhanced, and eliminated. The endeavors throughout the process has focused on creating and sustaining meaningful collaboration, empowering educators through the action research process, enhancing distance education strategies, and providing academically appropriate professional development. Embedded throughout the journey was the challenge to consistently stay true to the program and instructional principles.

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Integrating Inquiry Based Learning into Project Based Methodology Using a Constructivist Approach

Terry H. Daniels
Department of Education
St. John's University
Wm. E. Grady High School
New York City Board of Education
United States
crtstringer@pobox.com

Abstract: The problem faced in many K-12 classrooms is that teachers have access to computers but don't know how to infuse technology into their instruction. The goal of this paper is to set forth a plan to imbue in these teachers how to use computers in their classrooms and to use instructional technology to augment their teaching. The solution applied to the problem was treated through the implementation of project-based constructivist methodology. Each step in the process was reinforced through the use of hands on projects, which in turn were reinforced in the ensuing steps of the process.

Introduction

The National Education Association (NEA) (2001) has stated that technology is changing how faculty teach and how students learn. Administrators and faculty need to understand the role of technology in the classroom and how it complements the educational experience. Shaw (1999) cites a survey in which 13 percent of 1500 new and veteran teachers stated that they were well prepared to use technology in their teaching. Thirteen percent of veteran teachers versus eight percent of new teachers stated that they were not prepared at all to use technology in the classroom. The International Society for Technology in Education (ISTE) (2000) stressed that it is essential for teachers to create a learning environment through the powerful uses of technology. Technology should not be taught in isolation, but combined with traditional methodology to create new approaches to teaching curriculum while addressing individual needs. The National Council for Accreditation of Teacher Education (NCATE) (2001) contends that in the preparation of today's teachers, technology must become an integral part of the teaching and learning process in every setting.

Discussion

It is apparent that teachers in today's classrooms need support and training to learn how to use technology from the preservice to inservice levels. Shaw (1999) believes that the impact of teacher usage of a computer in every classroom will not become apparent until the class of 2004 graduates from college. Moore and Engeldinger (2001) discuss the need for preservice teachers to have a vision for the integration of technology into their classroom curriculum. This vision must precede the formation of the skills required to become competent users of instructional technology. Huffman (2001) considers what constitutes a successful technology-based learning environment. He stresses the importance of training the teachers who deliver instruction. A search of the literature revealed how to use technology in education, but no overall schema for training teachers to transfer this knowledge into the classroom. Teachers need a model to show them how to integrate technology into their curriculum, not how to use technology as suggested by Frances-Pelton, Farragher & Riecken (2000).

Implementation

A course of study evolved at two large northeastern institutes of higher education between September 2000 and June 2001. Twenty-five postgraduate inservice K-12 teachers in an Instructional Technology Master's program and 45 postgraduate inservice/preservice teachers/students in a stand-alone computer course

in a reading and writing program were exposed to a structured instructional technology course of study. Both courses of study used the same methodology and learning skills. Once learned, the basic skills of saving graphics, finding curriculum based Web sites and e-mailing attachments, were integrated into a project-based unit using inquiry-based learning (IBL).

The first step in the process is the development of the Scenario. This is similar a lesson plans motivation. The Essential Question and Foundation Questions called the Task, follows. This section is used to engage students in either decision-making or the development of a plan of action. The plan of action uses the previously learned skills to enhance the project with graphics and list resources and to create activities. The Product designates how the material gathered from the Task will be disseminated. The construction of an Assessment tool is the final unit. After the IBL unit has been completed, it is ready to be presented to students as a project-based thematic unit.

Conclusions

It is important in any course of study where instructional technology is used to have students become engaged in meaningful hands on projects from the onset of classes. Milbrath & Kinzie (2000) contend that teacher self-efficacy and attitudes must become positive toward the use of computers and technology in order for students to model them. Albion and Gibson (2000) observed that if teachers are to become successful at adapting technology into their curriculum, they require an understanding beyond that of being confident in using computers in their daily lives. Herrington and Standin (2000) discuss the use of real-life situations when designing a program. The use of PBL is authentic learning and adds meaning to coursework through the use of situations found in the daily lives of students. By connecting technology with active involvement in learning, Kommers and Mizzoguchi (2000) believe that teachers create a knowledge base that is described as a key issue by constructivists.

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Are We There Yet? A Composite Picture of the State of Computer Use and Teacher Training

Marietta Daulton
The Graduate School
Malone College
United States
mdaulton@malone.edu

Carol Welling Boltz
Newcomerstown Middle School
Newcomerstown, Ohio
United States

Patricia Nelms
Elena Tkac
West Elementary School
Youngstown, Ohio
United States

Christine Ehasz
Saint Paul K-8
Akron, Ohio
United States

Abstract: This report is a composite of findings related to the use of the computer in selected schools in Northeastern Ohio. Separate data bases are combined to present an answer to question of "are we there yet" in relation to the use of computers in educational environments. These areas include teacher use, student use, and perceptions of use.

Introduction

The introduction of the personal computer in 1975 launched a great prediction that the computer would revolutionize the way we teach and learn. The adoption of computer technology into American schools spread so rapidly that Ward and Zullo (1982) had declared that the movement was already an established order. While the predictions of the early 1980's were that by the year 2000 schools would be totally immersed in computer technology, the adoption of this technology may not have advanced at the predicted rate. By 1986 data relative to the rate of adoption and use of computer technology in schools was available (Daulton, 1987). For more than two decades there has been stated need for teachers to be able to use computer technology in their classrooms. The implications of not having and using computers to teach our children include that children who are not learning via the computer will be disadvantaged. Colleges and universities have struggled with the best teaching practices for preparing teachers to work with technology in the schools. Parents have questions the value of ways computers are used for teaching and learning. Schools, public and parochial, have experienced differences in acquiring the hardware and software for their teachers and students. Differences in teacher skills and attitudes toward using computers have impacted what has happened in the teaching and learning experiences. Four teachers who desired to learn more about the adoption and use of the computer in their schools have also attempted to answer the question of "are we there yet" in relation to the use of computers. While the answer to the question could easily be "not yet," a picture of where we are with computer technology and education can be presented. This picture may help to guide administrators, teachers, parents, and teacher educators in helping make computer technology an appropriate and effective educational resource.

The Study

This report is a composite of four studies and independent observations designed to answer the above question of where we are in use of the computer technology in certain schools. Schools of all levels have made great strides in acquiring the computer hardware and software needed for education. Experiences for teachers to learn to use the computer for effective teaching have been provided in many forms and levels. Most students in many schools have the opportunity to use computers for learning experiences. The presence of computers in homes has also impacted the student's use of computers for learning experiences. While the use of the computer as a tool in effective teaching is readily accepted, the goals remains that all students and teachers have full and easy access to computer technology for effective learning and for classroom management. To answer the guiding question of where we are with computer technology in education, the researchers designed surveys and collected appropriate data to answer the following questions:

1. Are there differences in availability of computer technology in public and parochial schools?
2. Do parochial and public schools have teachers adequately trained to use computer technology?
3. Is there a different in how public and parochial teachers use computers in teaching?
4. How does the availability of computers at home affect students of all abilities including gifted and learning disabled?
5. How does the availability of home computers impact teacher use of the computer at school?
6. Does the teacher's perceived level of computer skill impact the teacher's use and the student's use of computers in the classroom?
7. Does computer assisted instruction provide students with a positive learning experience and higher test scores?
8. What are implications from this data for schools and colleges in designing learning experiences for teachers as part of in-school and graduate education experiences?

Findings

Detailed answers to the above questions will be presented in the composite picture at the SITE conference. This summary includes only limited findings from the data and observations.

There are differences in the availability of computer technology in public and parochial schools. At the time of data collection, the public schools seemed to have more access to computers in classrooms and computer laboratories. This may have been a result of grants available to public schools through state and federal funds that the parochial schools have not had. While there seemed to be a difference in availability of computer technology in parochial and public schools, teachers from both systems have been provided with educational opportunities to learn to learn to use the computer in classrooms.

Computer availability at home does have a significant impact on how teachers and students perceive use of the computer for educational purposes. More gifted students reported having computers at home than other students. Fewer students with special needs reported having computers at home. Teachers and students with home computers also reported a higher use of computers in their classrooms. The initial critique of the data collected regarding the use of computer assisted instruction indicated that this process could improve overall grades and test scores. However, the researchers would be in error to say that the academic gains were strictly a result of the addition of computer assisted instruction.

Conclusions

The data collected helps to tell us how far schools have come in the use of computer technology. As rapidly as changes occur within this technology it is impossible to report a complete picture of where we are. However, from the data collected and from observations about teacher needs and requests we must continue to design graduate education courses in computer technology to meet the needs of all teachers. Early in the introduction of computers for educational purposes, many experienced teachers said they would retire before they were required to use the technology. That is no longer true. All teachers need to know about computers and are willing to learn if we provide the proper levels of training. Advanced technology courses and workshops provide experiences for teachers who have advanced beyond basic skills. While we would like to think that all entering the field of teaching are leaving undergraduate

education prepared to use computer technology, we cannot be certain. Frequently, teachers ask if workshops or courses that introduce the teacher to basic computer skills can be offered. These courses in basic skills for teachers fill easily and include recent graduates of teacher education programs as well as more experienced teachers, indicating that inservice and other in-school training has not provided teachers with the skills or confidence they need. Are we there yet? We have come far, but we are not there yet for all teachers and all students.

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Canada-Wide Francophone Network of Teaching Expertise

Robert David
Université de Montréal, Canada
robert.david@cyberscol.qc.ca

Judith Cantin
AQUOPS, Canada
judith.cantin@cyberscol.qc.ca

Michel Aubé
Université de Sherbrooke, Canada
maube@courrier.usherb.ca

Abstract : We have developped a training tool to fulfill the important training requirements emerging from teachers' new roles and practices. Built around a web application, this tool makes a strategic use of a collection of videos to foster teachers' ability to translate inservice training into new classroom practices. A characteristic power of this tool rests on its flexibility by allowing trainers operating in different contexts to build specific training paths online.

In January 2001, we have initiated the creation of a Canada-wide network of French interveners involved in training and supporting teachers. The goal for developing such a community was to create a space wherein we could exchange about innovative practices through using videos of teachers that typified good examples (David & Cantin, 2001).

In Canada, as in several other countries, the educational system has been transformed in order to help pupils develop the higher learning competencies they will need in the twenty-first century. The curriculum reform, based on higher learning competencies, has dramatically modified teachers' roles. In order to evolve in such a context, teachers must develop new teaching competencies: managing a complex classroom, integrating technologies and exploiting different resources, managing collaborative work, organizing knowledge and trying to evaluate in ways consonant with this new context (Perrenoud, 1999).

More than ever before, important training needs emerged from these changes concerning the teachers' new roles and practices. Fortunately, videos can play a significant role in this context. They allow showing good examples of what is expected from the teachers in terms of higher teaching competencies in new learning environments. Under certain conditions, video will also help develop observing competencies. The teacher's ability to identify important elements within a learning sequence is usually the first step to appropriate intervention. Ludlow believes that the video tool fosters the acquisition of professional competencies because it brings together teachers, training and the reality of the profession (Ludlow & Duff, 1997). Ensuring a greater impact in the classroom of preservice and inservice training is also a challenge. By providing many significant indicators, the use of video can have an important impact on the teacher's capacity to achieve higher teaching competencies (Copeland & Decker, 1996; Mottet, 1997). The use of technologies also entails giving teachers support when it is most needed and thus allows individualized training paths.

All these reasons explain the high interest for training environments based on the observation of videos. Therefore, we have collected over a dozen projects such as InTime (Plakhotnik, 2001) or CLICK (Chambers & Stacey, 1999). To this day, these projects are mostly closed templates developed so as to meet the specific needs of a university or a region.

The Project

As stated before, French Canadian communities are often small and the training programs as well as trainers vary from one province to the other. Our first goal was therefore to develop a web application to index all the videos produced across Canada and to classify them according to teaching competencies and characteristics of learning situations. Then we wanted people to be able to use this video collection in order to build their own training sequence.

The system we have developed is composed of six units designed so as to achieve the goals described previously. The first unit allows the selection of videos. It is a powerful indexing system which makes it possible to search through the video database and to select sequences on the basis of multiple criteria. The second unit makes it possible to build listening guides. This unit allows the trainer to target precise elements before, during and after the video in a learning situation. For example, it can be a text asking the learner to pay attention to an aspect of the training situation, in order to analyze the impact of transfer (Aubé and David, 2000)

or to compare the pupils and the teacher's point of view (Rand, 1998). The trainer can also use this unit to insert short video sequences such as the comment of an expert.

The third unit is oriented towards the integration of interactive elements aimed at supporting a reflexive practice. It could be multiple choice questions, open questions or elements making it possible to develop the observation competencies. With this unit and the two previous ones, the trainer can create case studies such as suggested by Merseth (1994). The fourth unit, much simpler, is based on an inventory of necessary teaching competencies. In a training situation, it allows the trainer to identify the competencies that are targeted and the learner to organize his or her professional development. In the same line of thought, the fifth unit allows the learner to build his own journal which contains the list of the observed videos and a repertory of targeted competencies. The sixth unit is a simple discussion group offering the possibility to exchange around case studies.

These six units allow to create diverse training paths in order to fulfill different needs. To complete this tool, we are actually initiating a unit that proposes situations to experiment competencies developed during the process. These learning situations are mostly WebQuests describing projects realized in classrooms.

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Helping In-Service Teachers Facilitate the Use of Information Technology During Pre-Service Teacher Field Experiences

JoAnna Dickey
College of Education
Eastern Kentucky University
United States
JoAnna.Dickey@eku.edu

Abstract: The results of a study completed by the author and two other colleagues inferred that student teachers reported a significant difference between their perceived ability to use and the actual use of information technology during their student teaching experience. Although pre-service teachers perceived themselves as being able to use technology for teaching and learning, they reported little use of these skills during student teaching. Based upon the results of this study, a project was launched during the Summer 2001 session. The goal of the project was to have in-service teachers (K-8) develop information technology application ideas and materials that could be shared with cooperating teachers. In turn, these ideas and materials could then be used to facilitate field experiences with visiting pre-service teachers. This paper will briefly explain the results of the initial study, project development, and project results.

Study and Results

The emphasis in the ability of teachers to use technology in the classroom for teaching and learning is a nation wide trend. In-service and pre-service teachers are expected to meet technology standards designed by the International Society for Technology in Education (ISTE, 2001). In Kentucky, a standard with performance criteria for technology knowledge and use has been established as part of the initial and renewal teacher certification process (Kentucky Education Professional Standards Board, 2001). This state standard is closely aligned with the ISTE National Educational Technology Standards and Performance Indicators.

Because the use of technology skills is an integral part of initial teacher certification, teacher educators Dickey, Long, and Reehm (2001) developed a study to explore student teachers' competencies in relation to the Kentucky technology standard for new and experienced teachers. Eastern Kentucky University student teachers in elementary, middle grades, secondary, and special education certification areas were asked in to complete a survey designed to rate their perceived ability and use of technology during their spring semester 2001 student teaching experience.

Survey participants (elementary N = 43, middle grades N = 26, secondary N = 59, special education N = 10) rated their performance on 27 criteria in each of four different performance areas. Participants rated their performance on a Likert scale (range 1 - 5) for: (1) ability, (2) frequency of use, (3) opportunities to use technology as a student teacher, and (4) observation of the cooperative teachers' use of technology.

Mean scores for each group of survey participants were computed and analyzed for all 27 criteria in each of the four performance areas. Results indicated that: (1) all groups met a high majority of the criteria in the area of ability, and (2) the number of criteria met by each group differed among the four performance areas. A series of t-tests computed to analyze these differences revealed that student ratings were significantly higher ($p < .001$) for ability than for the other three areas.

A regression analysis was computed to analyze students' ability, frequency of use, and cooperating teachers' use as predictors of technology use during student teaching. Results indicated that the frequency of use and cooperating teachers' use were significant predictors ($p < .001$) of opportunity to use technology by student teachers, while ability was not a significant predictor.

Although correlation does not determine causation, the findings in this study have important implications for teacher preparation programs. One implication, is that students may feel that their ability to use technology for teaching and learning is extensive but a specific effort may have to be used to

assure that these skills are actually used during field experiences, and in particular, student teaching. Another implication is that cooperating teachers may need assistance in facilitating the use of information technology during pre-service teachers' field experiences.

Project Development

The implications of this study indicated that there was a need to provide in-service teachers with information to help them facilitate the use of technology with visiting pre-service teachers during classroom field experiences. In order to help meet this need, a four-week workshop was developed for K-8 classroom teachers during the 2001 summer session at Eastern Kentucky University. Five elementary, one special education, and six middle school in-service teachers from at least nine different school districts participated in the workshop. After a series of self-assessments in operating system terminology, literacy terms, copyright regulations, and computer ethics, the workshop participants reviewed the Kentucky Education Professional Standards Board experienced teacher standard for the knowledge and use of technology (Kentucky Education Professional Standards Board, 2001). Based upon their self-assessment results and the review of the Kentucky technology standard, the participants were then asked to develop a professional improvement plan to expand their knowledge and use of technology for teaching and learning in the classroom. This professional improvement plan included a declaration of plans to develop a minimum of four portfolio artifacts that demonstrate classroom use of technology for teaching and learning. The goal of this workshop was to compile ideas and materials for elementary, middle, and special education teachers to share and use with field experience pre-service teachers. Therefore, the "sharing of ideas and materials" was an integral part of the workshop. Other activities included: (A) the development of an annotated bibliography; (B) three different field trips to school technology laboratories; (C) at least one software review; (D) at least one web site review; and (E) the participation in at least five presentation and sharing sessions.

Four weeks was a very short time period to assimilate and develop new skills, but all of the participants made dramatic changes in their ability to use technology for classroom teaching and learning experiences. The range of participant technology expertise ranged from novice to well developed. All participants were required to share their knowledge and creative ideas, therefore, those participants who needed technology assistance often contributed creative ideas and those participants that had some experience working with computers helped other students use the computers. A comfortable learning environment was established where mistakes and adventures could be made. The participants were asked to think of this experience as a "think tank" to develop ideas to share with other in-service teachers to help them facilitate the use of information technology during pre-service teacher field experiences.

Project Results

The participants went through several adaptations to be able to work with the software and equipment that was available at the workshop site. Some of these adaptations included the use of provided hardware and software that may have been different than those provided by their school districts. They quickly discovered that the use of digital images, color, or graphics increased file sizes. This factor made files difficult to save and transfer to their home site. All of the participants experimented with the use of color, graphics, sound, animation, and hyper-linking. When presenting their projects, they quickly discovered that a simple project could better introduce information without distracting movement or sound.

The artifacts that the participants developed for their portfolio and contributed to this project could be classified into six categories: (A) lists of favorite web sites for teachers; (B) word process projects with graphics; (C) tables and charts; (D) spreadsheets; (E) electronic slide shows; and (F) web pages. The web site lists contained sites where teachers could get information about lesson planning, unit development, content area, materials, assessment tools, electronic field trips, and "kid" learning sites. These web site lists also contain favorite search engines, government offices, state information, and professional organization sites.

Word processed artifacts usually included the use of graphics. Participants preferred to use color graphics. Ideas covered a wide range of classroom activities. Materials included: a classroom newsletter with a class picture; a school event flyer; a dress code brochure; an achievement award; and a series of reward coupons or passes for behavior management. The artifacts that focused on the use of tables and charts were developed for a variety of purposes. These materials included: a summary of student debit and credit accounts for purchases chart; a multiplication table; a student weekly work log; a weekly lesson plan table; a student behavior checklist chart; a school math curriculum chart; a work station assignment table; and an observation daily point sheet table. Several artifacts used spreadsheets during a content area study. Examples of these materials were: a spreadsheet listing the characteristics of volcanoes; a career study spreadsheet that lists the average salaries earned in various occupations; and a spreadsheet to report the results of a study in the number of blue or brown-eyed students in a class. Some of the content study spreadsheets were incorporated into electronic slide shows. The electronic slide shows that were developed also contained a wide variety of purposes. Some slide shows were developed to help parents learn about the teachers, classroom or school during parent-teacher conferences or school open houses. Other slide shows were developed to be used with the students to: introduce procedures, rules, or teachers; provide fact and content information during a unit of study; and prepare the students for a field trip.

The most challenging type of artifact for participants to produce was the development of a web page. One of the factors that contributed to this challenge was the adjustment that many of the participants had to make because their school district used a different software program than the one supported in this workshop laboratory. Some participants never had the experience of working with HTML. Therefore, there were several learning curves to master before being able to develop a web page. Information that was included on these web pages included: the teacher's name and contact information; the teacher's philosophy about how children learn; units of study for the year; classroom or school rules; helpful tips for parents; school activity announcements; and class projects.

Conclusions

The study conducted to explore student teachers' competencies in relation to the Kentucky technology standard for new and experienced teachers brought an awareness to the investigators that field experiences should be monitored to assure that the pre-service teachers experience the use of information technology. There was also an awareness made that cooperating field experience teachers may need assistance in acquiring information that will help them facilitate such experiences. Different delivery systems may be used to provide this assistance. Workshops, seminars, distance learning, and on-site training sessions can be developed to help prepare in-service teachers to facilitate the use of information technology when working with visiting pre-service teachers.

During the described workshop, participants expressed an appreciation for the risk-free environment; the cooperative and sharing atmosphere; and the time to experiment, develop and create useful materials. These in-service teachers especially liked the field trips to other school technology laboratories where they got to observe new ideas and discuss projects with fellow classroom teachers. Although this experience was offered as a short term workshop, each participant demonstrated growth in the use of information technology for teaching and learning by completing a professional improvement plan and contributing selected artifacts to the class project.

Plans to disseminate these contributed ideas and materials include: (A) providing demonstrations at school district professional development workshops; (B) sharing the project results with university professional laboratory associates; (C) present project information to educators at professional meetings; and (D) publish information in professional journals. There is a similar workshop scheduled for the spring 2002 semester.

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E-Supervison: Employing Videoconferencing in Supervision of Graduate Students

Carol C Dudding CCC-SLP
Communication Disorders Program
University of Virginia
Charlottesville, VA 22903
Phone 804.924.4622
Fax 804.924.4621
Email ccd3c@virginia.edu

David Drucker
Educational Technologies
University of Virginia
Charlottesville, VA 22903
Phone 804.924.0822
Email drucker@virginia.edu

Teacher education programs are always seeking ways to enhance the clinical training of graduate students. They desire to capitalize on the experiences provided from within the walls of the public school systems. In the areas of counselor education, educational psychology and speech-language pathology, this may include the need to supervise students during clinical training experiences. In addition, university programs are seeing a rise in the number of non-traditional applicants. These people are often seeking a career change and have other life responsibilities that make obtaining a degree as a full-time student impossible. With the increased availability of distance learning opportunities, applicants from outlying geographic areas now have access to higher education that they may never have had before. This presents a unique set of problems for programs that require numerous clinical training under the supervision of qualified professionals.

It was in direct response to these issues that the Communication Disorders Program at the University of Virginia began to investigate alternative means of student supervision. After much investigation it was decided that videoconferencing technologies would afford the program the ability to provide two-way interactive supervision to students at geographically distant sites. It allowed the program to expand in allowing students to participate in a masters degree program while maintaining their jobs in the public schools.

The program has developed and implemented a protocol that incorporates the use of videoconferencing technologies into an interactive, efficient and effective model for supervision. This model has greatly reduced the costs and loss of productivity associated with supervision of students in off-ground placements. Students report decreased stress and an increased feeling of independence when supervised using videoconferencing. The technology allows the supervisor to control the video image and provide audio feedback to the student without disrupting the session. This model of supervision has been readily embraced by administrators and technical support personnel within the public schools; thereby fostering relationships between the university and the public schools.

A videoconferencing unit and television were placed in the therapy room of the student clinician. The other unit was placed in the office of the clinical instructor on campus. The videoconferencing unit connected to the television monitor requires minimal space on a desk top or table surface. The most complex aspect of this endeavor was establishing adequate Internet connections to allow for the transmission of the audio-video information between the sites. This was worked out on a case by case basis with the technology personnel at the school. The student clinicians were responsible for obtaining the permissions for observation and videotaping. After the Internet connections were configured and permissions were obtained, a schedule of supervision of the student clinician was undertaken. The clinical

instructor was able to remain in her office while conducting supervision of student clinicians in the public school setting. The videoconferencing units allowed for two-way, interactive communication between the clinical instructor and the student clinician. The clinical instructor adjusted the camera throughout the therapy session allowing for excellent viewing capabilities. The instructor could provide audio input to the clinician through personal ear monitors without disruption to the therapy session. Feedback was provided to the student clinician at the end of the session through videoconferencing or as written feedback sent through email. It was possible for the clinical instructor to make video-recordings of the sessions for later review.

This presentation will address the key elements in implementing videoconferencing in the supervision of graduate students. A discussion about the specific equipment and technical support needs will be addressed. The discussion would include information and resources regarding issues of connectivity, administrative concerns and feedback from student clinicians. Participants would be encouraged to participate in a discussion regarding the benefits and perceived drawbacks of the model. Additional applications will be proposed.

A demonstration of the model will be conducted using portable videoconferencing units and personal ear monitoring system. Participants will be able to observe a clinical training session incorporating the use of videoconferencing. There will be an opportunity for the participants to engage in dialogue with the supervisee.

SCAFFOLDING KNOWLEDGE CREATION STRATEGIES IN TEACHER EDUCATION

Alison Elliott, University of Western Sydney, Australia

Collaborative learning environments and scaffolding provide cognitive supports to assist knowledge building in academically demanding situations. In such environments, participants work together to solve problems, develop solutions, negotiate meanings, and challenge ideas. Scaffolding facilitates knowledge construction by providing supports that guide, model and cue higher order processes involved in thinking, knowledge construction and problem-solving.

In the past decade, information and communication technologies (ICTs) have become widely recognized as valuable educational tools, yet, meaningful adoption of relevant technologies across curricula has been limited, even in schools that are well resourced. Clearly, teacher educators have an interest in fostering teacher professional development that will strengthen applications of information and communications technologies in classrooms so that student teachers can gain relevant pedagogical understandings, attitudes and skills.

Rethinking educational pedagogy

In recent years there has been considerable interest in developing environments in which learners work together to construct knowledge, seek new solutions, meet goals, and develop shared understandings about issues, processes and outcomes. The cognitive processes generated in these contexts are first manifested at an external level, and then gradually internalized to become part of the learner's independent repertoire of competencies (Bonk & Kim, 1998; Pea, 1987; Salamon, 1990; Vygotsky, 1978).

These interactive contexts require a new role for the teacher- as "facilitator" of learning The idea of "facilitating" has been around since the mid 20th century. Today, we have new insights into the importance of a facilitator as a mediator, strategist, and collaborator in learning, on the interactive nature of cognitions and social behaviors, and on the key roles of technology in education (Elliott, 2000; LaFrenz & Friedman, 1989; Pea, 1996; Rogoff, 1990; Scardemalia & Bereiter, 1996; Wertsch, 1991).

Purpose of the study and research context

This paper reports on a study of teachers' in–service experiences as they used the knowledge creation system, Zing™ (www.anyzing.com) to rethink their role as teacher in a technology rich learning environment. Teachers focused on the ways pedagogy must change if children, and teachers, are to become knowledge creators. As teacher beliefs are formed through processes of enculturation and social construction, and as beliefs are strong mediators of behavior (Mandler, 1975; Nisbett & Ross, 1980), teachers' understandings about ICTs in classrooms are important mediators of their practice. Teachers' scepticism about the role of ICTs in learning often stem from beliefs formed from their own negative experiences of technology, together with long held beliefs about the nature of teaching and learning (Elliott, 2000).

During the teacher in-service sessions examined here, 30 participants worked through activities supported by Zing™ to develop new understandings of ICT pedagogies and of their roles as facilitators of learning. Zing™ helps structure an environment in which participants orchestrate their own change processes in an authentic professional context.

Zing™ was developed in Australia and originally used for facilitating group-based decision making in the corporate and higher education sectors. Using one computer, a multiplexed set of twelve keyboards, and a cluster of monitors (or a shared projector screen) Zing™ sessions are customized to suit participants' learning goals and outcomes. Sessions have a built-in etiquette with times allocated to discussion, response, review and synthesis.

In the present study, Zing™ provided the framework and platform to help teachers examine their beliefs about ICTs and learning and to transform their pedagogy to use ICTs as knowledge creation tools. The mediational influences of the software-generated supports, together with facilitator scaffolding and participants' collaborative efforts, enable joint construction of shared knowledge about issues (Callan, 2001).

Sessions were designed for groups of between 6 to 20 teachers and were of about 12 hours duration. Participants were experienced teachers from both primary and secondary schools. The data reported here draw on transcripts of thirty teachers' responses during sessions. They document teachers' journeys to better understanding pedagogical issues relating to computer use and their roles as teachers in this new environment.

Participants worked collaboratively to examine their attitudes and beliefs about using ICTs in classrooms, and to develop specific facilitation and scaffolding techniques suitable for a classroom context. In the Zing™ environment participants are immersed in the learning and facilitation process through observing, modeling, rehearsing, evaluating and finally creating their own facilitator model. As each participant works through the activities and contributes to the discourse, his or her content is transferred (published) from an individual space to a team space where it becomes public property. Each participant contributes individually to the learning and knowledge

development process, and concomitantly contributes to the shared construction of knowledge. Zing™ enables all written responses to be stored on activity logs and archived. In addition, participants undertake a critique of each other's learning and the performance of the facilitator.

Results and discussion: Changing conceptions of ICTs

Analyses of participants' contributions to the sessions indicated clear shifts in their conceptions about the role of ICTs in the classroom. Initially, it was apparent that teachers' views of computer use were confined to traditional computer activities, such as drill and practice, word processing, information seeking, calculating and publishing. Participants' conceptions of themselves as teachers tended to be shaped by historical images of teaching and schooling.

At the conclusion of the sessions, when ICT and facilitation practices had been brainstormed, modeled, scaffolded, and acted, teachers had developed better understandings of ICT pedagogies, including ways of "scaffolding students' learning", "modeling changing pedagogy", "be(ing) active learners *with the* students", "maintain(ing) flexibility of learning styles and
Activities"

When reflecting on their experiences over the sessions, teachers commented that using the Zing™ system in this collaborative and scaffolded sense ensured that each and every voice was heard, that discussions were focused, and that all views were considered and valued equally. Teachers' changing views about techniques afforded in the Zing™ environment indicate new understandings about ICT pedagogical practices as illustrated below:

Importantly, teachers developed new understandings about facilitation through scaffolding and collaborative efforts. They were particularly interested in techniques of modeling, rehearsing, and brainstorming. Techniques to "capture everyone's thoughts and ideas"..."in an organized and systematic way".... "without evaluation from others" were seen as particular strengths to transfer to their own teaching. Equally, experience in actively using the technology and seeing each technique modeled, then rehearsing and later facilitating others' use of strategies were important in internalizing new ways of thinking about effective ICT use.

For teachers, the interactivity within the sessions resulted in information becoming part of a network of beliefs about teaching and learning in technology rich contexts. From this should evolve new beliefs and cognitions and that will, hopefully, be translated to classroom practice. Participants indicated that use of the technology enabled them to make sense of ideas and to construct new understandings of pedagogy. They believed that they would change their classroom pedagogy.

Concluding comments

Results from the present investigation have shown that a guided, mediated, and collaborative environment, which takes teachers through a process of observing, constructing and facilitating can shape new understandings about the role of ICTs in learning and ICT pedagogies. As mentioned earlier, beliefs about teaching develop through processes of enculturation and social construction and are changed by internalizing new conceptions and experiences. Hopefully, the apparent changes in teachers' beliefs about ICT pedagogies, because of their origins in positive and concrete experiences within a knowledge building context, will be strong enough to ensure concomitant changes to classroom practice.

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Books vs. Technology: Bringing Technology into the Children's Literature Course

Candace Figg
College of Education
University of Louisiana at Lafayette
United States
cfigg@louisiana.edu

Abstract: Although the student-learning goal of the Children's Literature Course is to provide students with knowledge of a broad range of quality children's literature, this paper outlines the perceptions of students in a Children's Literature class that utilized technology to support their learning experiences and discusses appropriate use of technology to enhance learning for courses requiring focus on print media.

Introduction

Although the dust surrounding the debate between print media and electronic media has settled, students in courses whose purpose is to provide a broad knowledge base of types of literature, such as Children's Literature, should be able to benefit from the support that computer technologies can provide in enhancing the learning experience. Because the research indicates that learning to use and incorporate technologies into daily practices relies upon training that incorporates "hands-on integration, training that extends over time, modeling, mentoring, and coaching, and posttraining access" (Roblyer & Erlanger, 1998-99, p. 59), providing skills to students without overwhelming them and detracting from the learning required to support course objectives, (e.g., reading vast quantities of literature and developing evaluative and comprehension tools for understanding the literature) becomes a challenge. This study investigates participant perceptions of the value and relevance of the inclusion of technology into the learning experience of participants in a Children's Literature course, and would be of interest to those who wish to use technology to enhance learning for courses requiring a deep focus upon print media.

The Study: Method of Inquiry and Data Sources

Due to the complexity of the learning environment and the multiple perspectives of the individuals participating in this study, this exploration of the perceptions of technology-based activities that students deem valuable within their learning experiences was conducted using Naturalistic Inquiry, the "investigation of phenomena within and in relation to their naturally occurring contexts" (Schwandt, 1997, p. 101). The study design allows the findings to "emerge" from the data as the value systems of the researcher and informants "interact in unpredictable ways to influence the outcome" (Lincoln & Guba, 1985, p. 41). The phenomenon is documented as it emerges through the use of certain procedures for data collection and analysis, as described by Lincoln and Guba (1985) and Erlandson, Harris, Skipper, and Allen (1993). Included in these procedures are the selection of a purposive sample, development of a "Person as Instrument" statement and maintenance of the researcher's Reflexive Journal, preparation of case studies, and collection and analysis of data from which the working hypotheses emerge. Further naturalistic techniques, including member checking, peer debriefing teams, and triangulation of multiple sources of data, were utilized to insure trustworthiness of the study.

The 25 female participants who served as the purposive sample for this study ranged in age from twenty to fifty-two years of age, with technology skill levels varying from little or no technology skills to novice. All participants entered with the ability to do basic word processing of assignments and had an e-mail account, but may or may not have used e-mail. During the semester of course instruction, participants utilized e-mail on a consistent basis to submit work and ask questions of the professor, conducted Internet searches for information and possible resources for inclusion in a thematic bibliography, experienced posting to the Blackboard discussion board on three occasions, participated in two online quizzes provided by the textbook publisher, and reviewed coursework assignments and work of other students on the course website. Little class time was dedicated to skill instruction, but was available from the professor via e-mail or fellow classmates who were taking the basic technology class simultaneously with this class. At the conclusion of their experience, they were asked the general question, "*What are the technology-related events and/or experiences in this class that you believe were valuable to your learning experience?* In addition to the data collected from the interviews,

data also collected from student portfolios, journals, and informal comments (made by students during the class sessions and e-mail conversations with the professor), as well as the reflective journal of the professor served as data sources. Analysis was conducted using the constant comparison method as described by Erlandson, et. al. (1993). Rigorous member-checking with participants and review of emerging themes by peer debriefing teams were also conducted in order to balance bias in interpretation. The emerging themes that resulted from this process are the findings of this study.

Findings

These findings are preliminary as the final interviews are still being member-checked, but three main themes (subject to refinement as the data collection/analysis continues) have emerged:

Theme 1: Students perceive technology training as invaluable to their learning process. Regardless of skill level, participants expressed the idea that technology is becoming so interwoven within the fabric of society that it is important for them to acquire as much knowledge about technology as possible. In addition, the use of technology to make their work easier (e.g., sending assignments via e-mail, locating course assignments online after missing class, or acquiring another copy of course documents stored online) was deemed valuable.

Theme 2: Inclusion of technology that students perceive as an authentic part of assigned classwork is valued. Students perceived three technologies: the use of e-mail to deliver assignments via attachments, the use of websites that provided course information and assignments as well as a forum for publication of their work, and the collection of information and resources from Internet sources as the most valuable of the tools used in the class because each of these tools was learned as a part of completing a required assignment.

Theme 3: Regardless of skill level, students valued technologies that they were able to successfully master. As students participating in the study began the course with beginning technology skills and class time devoted to skill instruction was minimal, ease of skill acquisition was important to the participants. E-mail, searching the Internet, and using the class website were easily explained via e-mail or by fellow classmates. Technical problems with some of the other technologies left participants frustrated and unable to participate.

Conclusions

Although the purpose of this inquiry was not to provide findings that are representative of all students, but to explore the perceptions of these 25 students as they reflect upon the value of technology in their learning experience this fall, the findings will provide the reader with a glimpse into the world of these participants thereby providing meaning and insights that might be valuable to the reader's own teaching and learning experiences. Thus, the lessons to be learned from the research presented in this inquiry are generally decisions that remain the responsibility of the reader, but the findings may suggest possible consideration in various contexts of incorporating technology to enhance learning environments of courses requiring a deep focus on print media. These considerations include provision of the following in course development as a means of assuring that students will view the inclusion of technology into their learning experiences as valuable:

- Just do it! Students are eager to use technology and view the learning of technology skills as important to their success.
- Include assignments in which the technology is an integral part of the assignment. For example, in the Children's Literature class, the students were required to create a thematic bibliography consisting of several book and non-book resources. Adding website resources to the requirements necessitated the need for students to locate, review, and apply the same criteria of quality evaluation to the website resources as to the other resources. In addition, the creation of weekly book annotations was a course requirement modified so that annotation files were submitted via e-mail attachments for inclusion in the online database.
- Design these assignments around the basics: e-mail, websites, Internet searching or provide class time for students to acquire necessary skills to successfully complete additional assignments.

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Demonstrating The Use of Instructional Technologies in Enhancing Effective Teaching Skills

Warren Flood, Ohio State University Extension, US
Nikki Conklin, Ohio State University Extension, US
Jo Jones, Ohio State University Extension, US
Linda Kutilek, Ohio State University Extension, US
Walter Warkus, Ohio State University Extension, US
Warren Flood, Ohio State University Extension, US
Nikki Conklin, Ohio State University Extension, US
Jo Jones, Ohio State University Extension, US
Linda Kutilek, Ohio State University Extension, US
Walter Warkus, Ohio State University Extension, US

This session will demonstrate instructional technology products that were designed by Ohio State University Extension to aid extension educators in enhancing their teaching effectiveness. The presenters will showcase a CD-ROM package for individualized learning. The following abstract describes the program.

As the outreach arm of The Ohio State University and with its organizational mission, *To help people improve their lives through an educational process using scientific knowledge focused on identified issues and needs,* it is imperative that the program personnel of Ohio State University Extension (OSU Extension) be skilled teachers. Many of OSU Extension's program staff are hired for their subject matter technical expertise. These staff members may or may not have a preparation in education and/or experience in teaching while incorporating experiential learning strategies.

OSU Extension has traditionally addressed the organization's need to enhance teaching skills among its program personnel via in-service programming that covered the basics of the teaching and learning exchange. With approximately 900 program staff members housed on the OSU Columbus campus, at research centers, and in 93 field offices across the state, providing in-service programming to meet the individual needs of the staff has proven challenging. OSU Extension employs roughly 50-75 new program staff members throughout the year, making the scheduling of a single in-service for all new hires difficult. In addition, experienced employees often indicate a need to refresh or renew their teaching skills.

The development team consists of four professionals from Ohio State University Extension. We also enlisted the help of a multi-media specialist from the College of Food, Agricultural and Environmental Sciences Communication and Technology Unit. Our roles included providing for the training and development of program staff of OSU Extension. Because are audiences teach non-formal educational programs in local communities, we are committed to providing a role model of experiential training methods to be used with both adults and youth. The experiential learning aspect of our research programs make them unique compared to programming efforts offered by other community-based organizations.

Through the development of the *Enhancing Teaching and Learning Dynamics Program,* members of the Employee Development Network intend to individualize the instruction of the teaching and learning exchange. What started as a single computer based training (CBT) interactive multimedia CD has now evolved into a full-scale training module. The program includes a resource CD, coaching for experienced Extension educators, and a set of in-service workshops. The single interactive multimedia resource CD has now become a set of three CD's. Each CD in the set contains the introduction to the set so that the individual learner may determine their own path for using the set.

The experientially-based multimedia CD component of the *Enhancing Teaching and Learning Dynamics Program* will serve as a resource for the staff member, providing video references, text information, still images and audio examples, hyper-linked text, video/text/audio examples of implementation methods, "pretest/posttest" evaluation instruments, comparis on log template, and application exercises. The Enhancing Teaching and Learning Dynamics Program has been designed to be used jointly by the coach, the employee, and the Employee Development Network as a training resource within OSU Extension.

Triadic collaboration: A three-sided approach to technology integration

Amy Gibbons, West Texas A&M University, US
Kathy Burleson, West Texas A&M University, US

Abstract

Triadic Collaboration: A Three-Sided Approach to Technology Integration

Societal expectations for the use of technology in schools continue to increase, reinforced by expectations of federal agencies (Department of Education), educational organizations, as well as national and state agencies. Institutions of higher education have developed a variety of approaches to respond to these pressures, primarily with the inclusion of a separate educational technology course in the pre-service curriculum (Thompson, Schmidt & Hadijiyiani, 1995; Thomas, 1996; Zachariades & Roberts, 1996). However, pre-service teachers are graduating feeling inadequately prepared to effectively integrate technology into the curriculum (Byrum & Cashman, 1993; David, 1994; Drazdowski, Holodick and Scappaticci, 1998). In addition, in-service teachers indicate their greatest obstacle to the integration of technology is the understanding of hoe to use it in instruction (Stuhlmann, 1998; Vannatta, 2000).

To respond to these situations, this study investigated a three-sided approach to modeling the integration of technology in daily teaching. University faculty, pre-service, and in-service educators were given information and demonstrations for modeling appropriate technology use in the classroom. Each of these three groups was given a needs assessment which consisted of surveys to find out what they already had knowledge of and were able to do in the classroom. Each group was also asked informally what they thought they needed to know more about to be able to successfully integrate technology into the classroom. Faculty development workshops that targeted technology implementation strategies were designed based on the needs of each group. These workshops were delivered throughout two semesters to each group separately so their needs could be met.

When workshops were completed, surveys were administered again to each group to perceive the impact of the workshops on the group and the use of technology in the teaching day. Observations of classrooms were made where appropriate to help monitor the types of technology integration that were applied before and after the intervention.

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Online Professional Development – lessons learned

Melanie Zibit Goldman, Boston College, US

"The [online] process has extended my classroom allowing me to have professional dialogue with other teachers. Today's schools are not structured to give teachers the needed time to discuss concerns or just to share innovative ideas. I now have an endless support team. Online discussion allowed me, and in many cases forced me, to rethink how I teach and what I teach. Because it was technology based it also forced me to better use technology as a tool for learning. .... I am now looking at how to use online discussion and collaboration with my students and their parents. (7th grade science teacher –MSTelementoring teacher)

"MSTelementoring", funded by the National Science Foundation, is an online professional development project for K-12 teachers in central New York State's Syracuse and Onondaga-Cortland-Madison Board of Cooperative Educational Services region. It provides sustained support for teachers as they work to change their practice to more inquiry methods in math and science, fosters the integration of the Internet into existing curriculum, and provides an online mentoring group for sharing and learning. Teachers use the Internet during (and after) school hours to find out what each other is doing, to share meaningful personal reflections on their practice, to seek suggestions for solving problems or new ways to do a curriculum unit.

Over the three years of the MSTelementoring project we experienced success as well as difficulties fostering online learning with inservice teachers. This paper/presentation will share what we have learned about:

- **Designing online learning so that it helps teachers grow as professionals**
- **Facets and constraints of online discourse**
- **And strategies to get teachers to exchange reflections, ideas, issues, and potential solutions**

I. Designing online professional development:

It is important to go beyond the conception of professional development as "training." Professional development needs to be defined in ways that include "formal and informal means of teachers to not only learn new skills, but also develop new insights into pedagogy and their own practice, and explore new or advanced understandings of content and resources" (Miles Grant, 1997, p 72) Changing one's practice is not something that can come about by attending an isolated week long workshop but is an ongoing process that must evolve over time and in the context of a teacher's daily work. Overtime, teachers need the support to experiment, reformulate their ideas, change their beliefs, and realize they are the best qualified to challenge themselves and direct their own learning. The key facets in the design of MSTelementoring professional development are:

1. Make professional development relevant

In MSTelementoring teachers take ownership of their growth and collaborate on the direction of the project. As teachers become part of an ongoing learning community, they grow in valuing themselves as a community of professionals, begin to feel more empowered to decide what is of value to them and find a voice to shape their own learning and the project.

What this means for the design of MSTelementoring is that it must be flexible to shift with the changes and needs of its teachers. Through discussion with teachers and monitoring teachers' progress, the project staff design agendas and experiences that relate to where teachers are developmentally and guide them to new skills, content, practices and beliefs.

2. Include a mix of online and face to face

A mix of face to face and online learning worked best to build a strong community. The face to face allows teachers to get re-acquainted, to deepen their relationships, and to enjoy the energy of brainstorming and discussion during the sessions. The face to face has also brought learning of new skills and content that fed into what teachers use and discuss online once back in the classroom. Teachers value the online for anytime, anywhere collegial sharing and support, particularly those who are isolated or in rural districts. Although 86% of the teachers said that online communication was very useful or somewhat useful, teachers still favored the face to face.

3. Teachers formulate a blueprint for their own learning
Every year we have had teachers create Professional Development Plans at the end of the summer session. The development of Professional Growth Plans involves teachers reflecting on what they would like to accomplish over the year related to changes in inquiry-based practice, new math and science curricula, integration of technology, and leadership in their community. Around mid-year we asked teachers to revisit their plans to see what they have accomplished and rethink their priorities going forward. At the end of the year we ask them to again think about where they have been and what they have accomplished.

II. Facets and constraints of online discourse

Online learning takes time, self-motivation, and a focused cognitive process of reading and reflection with the text-based medium. Online discussion requires concentrated blocks of time to read, think and respond. The usual rapid-fire approach we associate with communicating face to face does not work. Thus, with teachers' workloads increasing, it is difficult for them to find time unless it is in the evening or on the weekend.

1. Self-motivation:
The online environment differs from face to face instruction in that it is all computer-mediated. Participants have to read between the lines to compensate for lack of sense cues and a participant's self-motivation to keep involved must be that much greater. The participant must develop a "cognitive language" that makes the ideas expressed in computer text come alive with meaning and excitement. This is a very difficult endeavor considering that teachers spend their days in face to face classrooms, interacting with their students. It also requires self-motivation to read and catch up on ones own when a participant has been absent from the online for a length of time..

2. The environment in which teachers teach
The factors we found inhibiting teachers from making the kind of progress we would hope include: (B. Hunter 1999 , the 1997 NSN Survey Report H Becker).
? lack of time for experimenting, training, planning and implementing
? unstable technical infrastructure
? little local control over resources
? lack of administrator's understanding and support
? no sustained or long term professional development program
? shifts in school system priorities and curriculum
? teacher workload
? lack of equipment access

III. Strategies for engaging the teachers

1. Online environment
Easy to use technology is essential! New possibilities in online learning platforms opened up in the course of the three years so that in this last year, we moved to Blackboard courseware. This turned out to not only facilitate online discussion and sharing of material within the project, but served as a catalyst for innovation in teachers' classroom practices.

2. Teams play a critical role
There are many factors that make one teacher team work together more successfully than another. These factors are 1) individual teacher motivations, e.g., desire to be connected to other teachers or interest in growing professionally; 2) the relevance of the tasks and discussions to his/her needs, 3) easy access to technology, 4) release time, compensation, or support within the school for participation, 5) the degree of isolation of a teacher's situation; 6) having common interests; 7) maintaining a critical mass of exchanges. When we were able to match members in terms of their motivation, desire to contribute, and access to technology we have seen healthy discussions.

3. Moderators are key to success
Facilitating in the online environment is quite different from face to face. Conversation is mediated through the virtual environment where the challenge is to overcome the absences of sense cue and personal presence. Moderators play a critical role in overcoming this lack of cues to build a sense of trust and openness in an online environment. A successful moderator is in touch with individual teachers through personal email exchanges and phone calls, monitors who has not participated, follows up to find out why and finds solutions, and models posts online that are characterized

by openness and depth of reflection . Just like your classroom environment, engaging in discussion that moves from short brief answers to deeper meaning and reflection online takes skill and practice. It is critical to have moderators who have expertise in the content of the professional development, are good "listeners", and are experienced or willing to learn how to facilitate online discourse.

Information Society and the New Information Technologies in Portugal

Natália Fernandes Gomes
Instituto Politécnico da Guarda
Escola Superior de Tecnologia e Gestão – Portugal
natagomes@ipg.pt

Introduction

This presentation analyzes the reasons and motivations of the Portuguese Information Society, its origins and characteristics, and the importance that this new society can have in education. Computers and digital networks have proven to be the best way to access information and knowledge that is essential for the development of a country. In order to prevent the info-exclusion of those that can't have access to these technologies at home or at work, it is crucial that computers and networks become accessible in public places like schools and libraries. We will describe the Portuguese government initiatives in relation to this question, which intend to generalize access, improve education and also create jobs.

The Study

Portugal began to define a policy for development in the area of what would become the Information Society in 1995. The Mission Statement for the Information Society and its National Initiative were first created and staged in March 1996.

The National Initiative sparked widespread national debate about the Information Society (which I will hereon refer to as IS), out of which was developed a set of guidelines that would accelerate and democratize the use of modern technologies. The debate also gave wing to the Livro Verde para a Sociedade da Informação em Portugal (which I will refer to as the Green Book), which serves as the essential reference for correct and sustained implantation of IS and its notoriety in Portugal.

With governmental support for the Green Book, various guidelines and vectors of orientation were structured into a clear plan of action, which resulted in projects including:

Science, Technology and Society Network (RCTS[1]); Internet in Schools Program; Computers for Everyone Initiative; Digital City Program; National Initiative for Electronic Commerce; National Initiative for Citizens with Special Needs.

Following the publication of the Green Book and all of the initiatives that grew out of it, policies and measures for the development of information technology were defined and applied in order to guarantee the success of the Portuguese IS.

National Initiative for the Information Society

The National Initiative for the Information Society constitutes an important cornerstone in the implantation of IS in Portugal. In fact, this Initiative played a fundamental role in the accelerated and democratic diffusion of the use of modern information technology, sustainedly integrating the old and the new, knowledge and know-how. It also identified barriers of a technical, organizational, social, cultural or economic nature, problems which could interfere with the full development of an informed, democratic and open society, as the Green Book points out.

This Initiative was founded on the awareness that educating citizens begins in school, which translated into the following measures in which new information technology played an extremely important role, namely:

1. The Well-Informed School, including computers and Internet access in every school (K-12) through RCTS;

[1] RCTS: Rede Ciência Tecnologia e Sociedade – initial in Portuguese for Science, Technology and Society Network

2. The Open Government, including computer access to governmental services and forms, in an attempt to minimize bureaucracy and improve efficiency, which meant installing computers in libraries an public archives;
3. The Well-Inform Citizen, creating ties among city halls and local interests;
4. Accessible Culture, guaranteeing libraries, museums, youth centers, archive and documentation centers, and research and development information on-line;
5. The Well-Informed Firm, motivating and creating incentives for the use of e-commerce;
6. Health First, computerizing health services and, consequently reducing costs and inefficiencies of the current system;
7. Handicapped Program, encouraging integration of these citizens in the use of information technology.

It was through these objectives that equality of access for all citizens who could benefit from IS was established.

In fact, in current society, knowledge is one of the most important components of development, making it necessary to create structures which contribute to a rapid and efficient spread of knowledge among the most diverse sectors of society, giving particular importance to sectors in which the creation and absorption of information could have a significant multiplier effect. In this vein, the following objectives were defined:

1. Expand RCTS to all K-12 schools and institutions of higher learning, libraries, museums, youth centers, archive and documentation centers;
2. Promote the creation of a network of Internet servers, to enhance the accessibility of cultural issues throughout the Portuguese and Portuguese-speaking communities around the world;
3. Develop support programs for the creation of multimedia projects with cultural content;
4. Promote the computerization and digitalization of historic archive and cultural patrimony;

The Well-Informed School

Of the sectors of society, education probably benefits the most from the use of new information technologies, since it is based on knowledge acquisition, actualization, and use. Within the education system, the following measures were defined:

1. Install computers, as previously explained;
2. Promote the development of educational and cultural content, of support for teacher activities and initiatives, and the educational process, all in ways favoring the use of information and communication technology;
3. Create teacher training programs, for all levels.

Science, Technology and Society Network (RCTS)

The creation of the RCTS reinforced the network connecting Universities, Polytechnic Institutes, and R & D Institutes, really becoming the national "backbone", as cited in the document "Portugal in the Information Society" (my translation), from the Ministry of Science and Technology. This reinforcement allowed for the growth in bandwidth to 4 Mbps. In addition to this growth in national connections, international connections also grew from a bandwidth of 512 Kbps in 1995 to 34 Mbps in 1999. Further to the growth in bandwidth, the objective of installing a digital infrastructure in schools was accomplished and 15 Points of Presence (PoPs) were installed, primarily in institutions of higher learning and R & D institutions all over the country.

The RCTS has also permitted the growing development of communication between scientific, technological and socio-cultural communities, creating conditions for equal access among teachers, students, or library users to new information and communication technology.

Beyond this infrastructure of equipment and logistic support, Internet sub-domains were created, making e-mail addresses and space for publishing pages on the World Wide Web (WWW) available for all connected institutions, as well as a set of Internet tools and services, related to e-mail, chat rooms, and content production for the WWW.

Internet in Schools Program

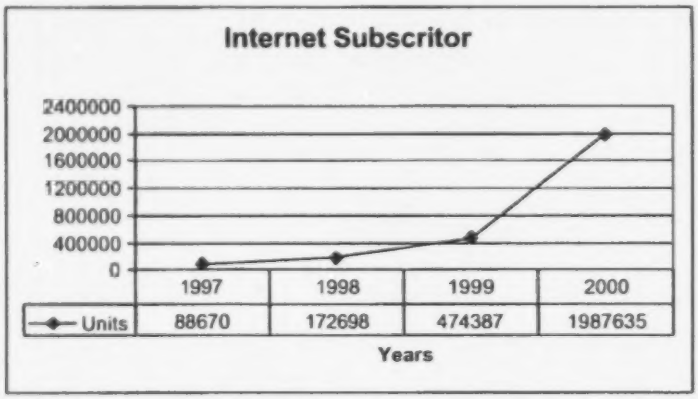
The Internet in Schools Program, through RCTS, brought Internet connection to all schools, both public and private, from the fifth to the twelfth grade, comprising multimedia computers in school libraries and/or school media centers. This has facilitated students' recourse to Internet research and expression and CD Rom publications.

Although the program initially planned on connecting only high schools to public libraries, it was expanded to include fifth grade on and Teacher Training Centers in 1998 in two phases, in cooperation with local authorities. In September 1999, 1700 schools (with students from the 5th to 12th grade), 220 schools (with students only in the 5th and 6th grade) and 80 additional clubs of a cultural, scientific, and educational nature were connected, in addition to 250 public libraries and 15 museums.

Throughout this time, hundreds of thousands of students and teachers have been sensitized, systematically and practically, to the pedagogical potential of the Internet:

1. more and faster information research and recovery systems;
2. more autonomy and democracy in information access and communication among schools and with society;
3. student familiarity with technology and technological processes which could be encountered in their professional future.

The Internet in Schools Program is a project of the Support Group for the Educational Telecommunications and Computer Network (uARTE[2]), in collaboration with the National Scientific Computation Foundation (my translation), with the participation of other entities, such as Regional Government, Citizen Groups, and Municipalities.



Graph 1 : Illustrates the growth in access subscritor to the Internet between 1997 and 2000. The data shows an increase of approximately 182% in the last three year (www.cisi.mct.pt).

Operational Program of the Information Society (POSI[3])

The IS has been defined as a national priority. Its plan, entitled "Towards a Society of Knowledge and Information, 2000-2006", comprises two operational programs:

1. Science, Technology and Innovation, which in the mid-term hopes to bring to bring the country up to speed in science, reaching the average level of the European Union;
2. Information Society, which should build the bases needed for sustained implantation of the Information Society in Portugal.

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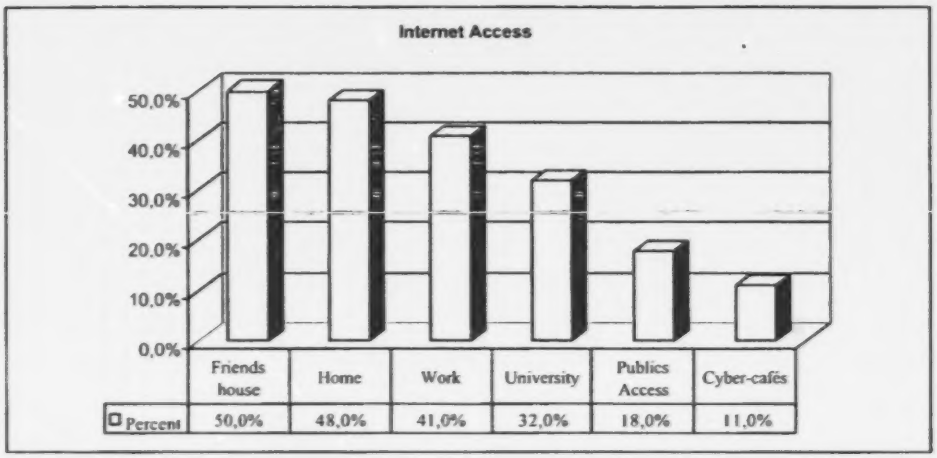
[2] uARTE: Unidade de Apoio à Rede Telemática Educativa –initial in Portuguese for Support Group for the Educational Telecommunications and Computer Network

[3] POSI: Programa Operacional para a Sociedade da Informação – initial in Portuguese for Operational Program of the Information Society



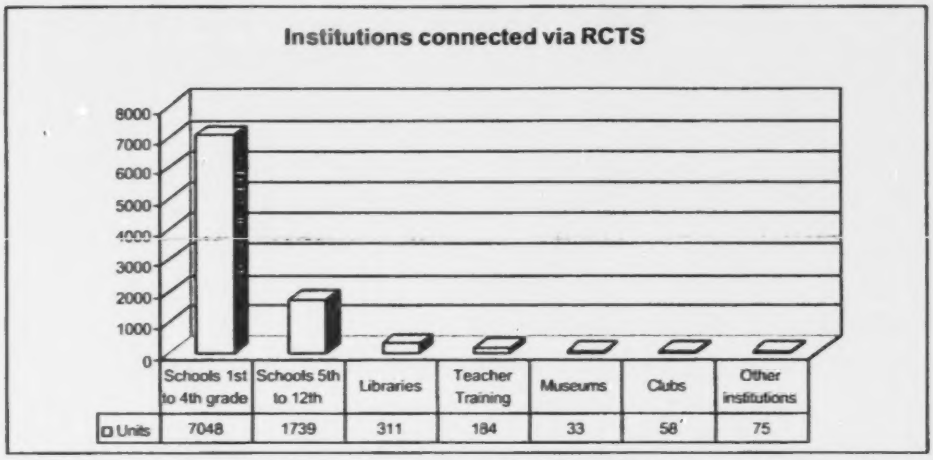
Graph 2: Illustrates the percent access in 2001 by different places in Portugal (www.cisi.mct.pt).

POSI, following on the heels of the Green Book, has come about as a sign of government support for the continuing and growing importance of the Information Society; it has successfully stimulated access and guaranteed a dynamic development and experimentation related to the social use of new information technology in all areas of development. A set of measures has been delineated to reinforce the importance attributed to this growth, namely:

1. Promote the generalized use of the Internet - Internet Initiative;
2. Increase the number of home Internet connections by four;
3. Generalize the availability and use of e-mail and Internet for the entire Portuguese population through the creation of public access areas, like cyber-cafés and media centers;
4. Free access for all educational institutions;
5. Increase the number of Portuguese content sites by one thousand;
6. Create a national training and certification process of basic competency in information technology;
7. Link a diploma of basic competency in information technology to the level of obligatory education (ninth grade);
8. Make all information published by public entities available on the Internet;
9. Carry out the National Information Highway Plan, stimulating offer, interconnectedness, use and regulation of the bandwidth of networks
10. Create an R & D program in the area of IS;
11. Create an R & D program in the area of IS aimed at developing Portuguese language content.

This program is part of the European Community, englobing an investment of approximately €625,035,000, distributed evenly over the years of execution.

The expansion of the Internet in Schools Program gave rise to the signing of a protocol between the Ministry of Science and Technology and the National Association of Municipalities on the 26th of February, 2000, which established the end of 2001 as the final date for connecting the 8,600 schools in the nation. Currently, 9,448 institutions, excluding those of higher learning and research, are connected to the RCTS, distributed as follows in graph 3:



Graph 3: Illustrates the units of institutions connected via RCTS in 2001 in Portugal (www.cisi.mct.pt).

Conclusions

We defend that youth population must have access to the information available in digital networks, and also to the powerful instruments of the Information Society. They must have the possibility and the ability to process text, image and sound in order to create collective or individual work without any frontiers. We believe that only with these creations, is it possible to concretize a cyberspace that guaranties an efficient and fast access to information for all. Universities, as a key element, must contribute as essential entities within digital networks, using both as resources to transmit scientific and cultural knowledge, giving support to professors and schools creating thus the appearance of new electronic means like Internet.

The potential of information technology is ideal to serve the objectives of education. In this context, we believe the Information Society will give rise to new perspectives in education and new forms of study, which will increase the global level of literacy.

The future of Portuguese youngsters should paved via two components: the Information Society and the information technology, in a way that allows for the creation of new skills for the successful development of the country.

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Managing change: Critical considerations for IT professional development for practicing teachers

Jennifer Jenson, York University, CA
Brian Lewis, Simon Fraser University, CA

For the two years our research has examined the implementation of computer technologies in schools across Canada, focusing on the problem of managing change within what we see as a transitional period in education. This paper will report on one significant portion of our findings – the disparity between professional development programs'purported skills training using computers and teachers' actual "uptake" and use of that training in their own classrooms.

We have identified and clarified some of the more pressing questions arising from the implementation of computer-based technologies. These questions involve technological, infrastructure, human resource and learning policy issues, including teachers' professional development; questions of sustainability; and questions of public policy in an increasingly technocentric and commercial education environment.

Each of these issues speaks to the need for strategies designed to address how and why choices are made, who makes them, and with what effect, both intended and unintended. Too often the reverse happens: technology changes rapidly and decisions are made in a more or less ad hoc fashion, as administrators scramble in response to the initial promises of technology. Then these same administrators, as well as teachers, students and parents, must face unforeseen problems and demands triggered by its implementation.

Public Policy: A Global Shift

There is a critical need for a reflexive approach to the implementation of technology in our schools that responds to issues of policy, organizational culture, politics, and decision-making practices. These issues are of particular importance as Canadian public policy in all areas has become concerned with the country's transition to a "knowledge society" – a transition which has brought increased attention to education, as a primary "resource" in the development of a "knowledge economy" infrastructure.

In Canada, among other countries, policy-makers have largely shifted their focus away from cultural protection and protection of the public sphere – in any traditional sense. The Canadian government's commitment to a globally-oriented, privately-developed, market-based regulatory framework has thrown into question the nationalistic communications policy framework of the past several decades. As a new communications infrastructure is being established, an entirely new policy framework is developing as well.

In justifying their policies, governments have employed idealistic and simplistic visions of what the "information revolution" will mean. In their rush to remain competitive with the United States and the rest of the world, few policy makers are asking traditional, yet fundamental social questions about the risks and changes these new policies will shape. The "education revolution" has become a small but critically important part of a more general information revolution, and subject to similar policy changes. Policies addressing the implementation and use of new technologies within education have become firmly entangled within overall information and economic strategies and objectives. It is as if a major fault line has shifted – social activity has come to be increasingly judged and evaluated through economic objectives and priorities. Education is central to this shift. Education, long a "goal in itself," a "public good," has become more purely a means to the end of a more efficient and competitive economy and workforce, immutably situated within the notion of the "knowledge economy."

"Investing" in Education: New Technologies

One significant result of this broader policy shift has been an added emphasis on information technology in Canadian public schools. Information technology is a tempting answer to education's perceived shortcomings in preparing students for the knowledge economy. Computer technology provides a tangible link between the world of education and the world of work.

In the past few years there has been an extraordinary amount of interest and investment in the deployment and use of computers and computer networking in Canadian public schools. The 1998 federal budget, for example, committed $205 million over three years to Industry Canada's "Community Access Program" and "SchoolNet." As the number of computers accessible to students and teachers in classrooms and labs has increased, there has been a corresponding emphasis on "integrating technology across the curriculum." Teachers' effective use of computers in their classrooms, however, remains an elusive goal. Researchers have identified numerous barriers to teachers' use of computers in their classes, such as limited equipment, inadequate skills, minimal support, time constraints and the teachers' own lack of interest or knowledge about computers (see, for example, Bryson & de Castell, 1998; Berg, Genz, Lasley & Raisch, 1998; Clark, 2000; Ertmer & Addison, Lane, Ross & Woods, 1998; Hadley & Sheingold, 1993; Laferrière, Breuleux, Baker & Fitzsimmons, 1999; Macmillan, Liu & Timmons, 1997; NCES, 1999; Schrum, 1994, 1997, 1999).

Teachers and Technologies: the question of professional development

Rightly or wrongly, teachers have come "under fire" as insufficiently skilled to make use of promising new technologies. Meanwhile, substantial funding resources continue to be dedicated to the purchasing of hardware and software while neglecting the human part of the equation: teacher support and development.

Governments, faculties of education, school districts, schools, communities and individuals have belatedly come to understand the need to give teachers access to training and development in required information technology skills. In British Columbia, for example, in 2001, the Ministry of Education earmarked $1.6 million for professional development in the integration of technology into classroom instruction for 1,000 teachers of grades 6 to 9.

While programs for providing professional development have varied widely and have been examined in detail in a number of U.S. based studies (see, more recently, Hoffman & Thompson, 2000; NCES, 1999; Sorg & Russell, 2000; Schrum, 1999; Swain, 2000; Walbert, 2000) and a Canada-wide study (Laferrière, Breuleux, Baker & Fitzsimmons, 1999) we have looked at three examples of professional development in Canada, each enacted at a different administrative level (faculty of education, school-district and school-based), and each employing a different strategy for professional development.

We have used several methods for gathering data in our work: documentary research, on-site visits, workshop observations and semi-structured interviews with teachers, project developers and administrators. Through these techniques we have identified a common range of issues encountered when teachers' participate in large- and small-scale professional development programs.

Of significance for each of the examples we chose to explore is how teachers and administrators respond to and speak differently about the programs in which they are involved. There exist striking disjunctures between what, from their particular subject positions, teachers identify as salient and relevant professional development, and what the professional development program itself purports to accomplish. Administrators and teachers have divergent perspectives on these issues mapped largely onto their positions within the institutional structure of schooling.

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WebQuests for Course Delivery and Integration Training

Lamont Johnson, Ph.D.
Department of Counseling and Educational Psychology
University of Nevada, Reno
United States of America
ljohnson@unr.edu

Kimberly Vidoni, M.A.
Department of Counseling and Educational Psychology
University of Nevada, Reno
United States of America
kvidoni@unr.edu

Kulwadee Kongrith, M.A.
Department of Counseling and Educational Psychology
University of Nevada, Reno
United States of America
kongrith@unr.nevada.edu

Abstract:
A graduate/pre-service education course was redesigned at the University of Nevada, Reno. Course instructors believed that students would better grasp the course objective of creating a WebQuest for target classrooms if this activity was modeled for them. Therefore, the course's entire content was transformed into a WebQuest. An evaluation was conducted at the end of the semester. Results suggest that students perceived that they learned new technology skills for the purpose of creating their WebQuests while master teachers perceived that the WebQuests created by the students were useful tools for their teaching.

Currently, there is much discussion about *how* to successfully integrate technology into the classroom (Maddux, Johnson & Willis, 2001; Geisert & Futrell, 2000; Jonassen, 2000; Bitter & Pierson, 1999; Alessi & Trollip, 2001). Many educators believe that there are many benefits to integrating technology into educational environments. New technologies, computers specifically, can teach ideas and concepts in exciting, enjoyable and efficient ways (Maddux, Johnson & Willis, Geisert & Futrell, 2000; Jonassen, 2000; Bitter & Pierson, 1999; Alessi & Trollip, 2001). However, bringing computers into classrooms is expensive, both financially and in terms of the time and effort required. Therefore, it is essential that computers contribute to the achievement of important, rather than trivial educational goals. One means that may contribute to the accomplishment of this goal is the use of a Web-based, inquiry-oriented activity called a *WebQuest* (Dodge, 1995).

A graduate/pre-service education course that traditionally covered computer telecommunications skills and concepts as well as methods of integrating information technology into the classroom was redesigned. It was reasoned that if the WebQuest approach to emphasizing the use of the Web in learning was a good idea for K-12 students, it should be a good idea for pre-service educators and graduate students. Therefore, a WebQuest was designed to encompass the entire course's content. The major course project became the *task* section of the WebQuest that required each student to design, build, and conduct a WebQuest in cooperation with an in-service teacher. Most of the correspondence and cooperation between the student and the in-service teachers was done over the Internet via e-mail. This approach has two advantages. First, it models information technology in the curriculum. Second, it provides students with a real-time learning opportunity in using the Internet and World Wide Web to enhance teaching and learning.

Course Design and Procedures

The 18-week course was designed to model a WebQuest so that students would experience WebQuests as students before designing a WebQuest for target students. The course WebQuest was uploaded onto the university server so that students had access to the site from any computer with an Internet connection (Johnson & Vidoni, 2001). Students completed four *miniquests*— or lab-based learning exercises that covered the basic computer skills necessary to create a WebQuest – and submitted their assignments to the instructor via e-mail. Links to journal articles related to course content were also linked to the course WebQuest and in-class discussions were conducted on the readings so that students would critically evaluate issues related to educational technology.

Students designed WebQuests that were used by teachers in real classrooms. Master teachers participating in a PT^3 Grant at the university were paired up with most of the students. Some students preferred to work with university faculty and were encouraged to do so. Although many of the master teachers lived over 100 miles away from the university, students whose master teachers lived in the local area made site visits to their master teachers' classrooms. Students made three presentations during the course. The first presentation was made during the sixth week of the course for the purpose of discussing project ideas with classmates. Students received critical feedback from instructors and fellow students that they used to modify their WebQuests. The second presentation occurred during the tenth week of class once students had completed their WebQuests and just before they posted them on the Web for target students to use. A final presentation was made for the purpose of reporting the results of their project.

Evaluation Results and Suggestions for Improvement

All nine master teachers and 9 students completed evaluations. Most narrative comments were very positive. Students and master teachers rated all 5 statements of the evaluation with a mean of 3.6 or higher on a 5 point scale with 5 being the most positive. Students strongly agreed that the WebQuest required them to learn new technology (M = 4.89) while master teachers agreed strongly that the WebQuest created by the students were useful tools for their teaching (M = 4.33).

Some improvements will be made next time the course is offered. First, master teachers will be invited to a class meeting so that students and teachers can meet before they start working together. There were a few communication problems between students and teachers that face-to-face introductions would eliminate. Second, the class Web site was a little crude and changes to its appearance will be made.

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Using Web-Based Conferencing to Promote Interactivity and Collaboration in Teacher Preparation

Dr. Dennis Knapczyk, Department of Curriculum and Instruction
Indiana University Bloomington, USA
Knapczyk@indiana.edu

Carrie Chapman, Department of Curriculum and Instruction
Indiana University Bloomington, USA
Cechapma@indiana.edu

Mary Kelly, Department of Curriculum and Instruction
Indiana University Bloomington, USA
Malkelly@indiana.edu

Li-Fen Lu, Department of Curriculum and Instruction
Indiana University Bloomington, USA
Lflu@indiana.edu

Abstract: The Collaborative Teacher Education Program (CTEP) at Indiana University offers coursework leading to teacher certification in special education through a distance-learning format. CTEP uses the web as a supplement to synchronous video-based instruction and as a stand-alone course delivery approach. The major aims of the web-based activities are to promote interaction and teamwork among teachers, and to build collaborative skills.

Introduction

The Collaborative Teacher Education Program (CTEP) offers distance education coursework to in-service teachers in rural communities in Indiana. The program is comprehensive in that teachers can earn teaching licenses or master's degrees in special education by completing the twelve courses it offers (Knapczyk, Chapman, Rodes, & Chung, 2001). Our primary mode of course delivery is videoconferencing; however, we integrate web-based activities into the courses to increase instructional opportunities and to promote collegiality and collaboration among the teachers (Rodes & Knapczyk, 1996). Some class sessions meet solely on the web, and one course is primarily web-based.

Collaboration is a key area of emphasis in CTEP. Although the trend toward inclusive educational programs has increased the level of interaction between special education teachers and their colleagues in some schools, many still work in relative isolation. In CTEP, we use a variety of activities and assignments to encourage our students to interact and collaborate with one another and with teachers in their schools. We have found that promoting collaboration in these ways lays a foundation for increased on-the-job professional collaboration, and that the web offers a powerful tool for building these skills.

CTEP uses SiteScape Forum (SSF) as its web conferencing software. SSF is an easy to use web-hosted tool that incorporates two elements for holding discussions: *forums* and *teams*. A *forum* is a collection of related information that allows learners to interact on issues and course concepts. In a forum, our students have class discussions in response to questions or issues posed by an instructor or classmate. A *team* is a shared environment in which small groups work on tasks and problem solving activities. The forum and team interactions we structure are usually asynchronous but we use synchronous 'chatting' occasionally.

Building Expectations and Skills for Collaboration

In order to use the web for instruction, we must consider our students' skill and comfort level in using technology (Rodes, Knapczyk, Chapman, & Chung, 2000). Some learners are fearful of losing personal contact

with their instructor. One time we had a teacher who decided not to take one of our distance-learning courses even though the nearest campus-based class was over an hour away. "Oh, no," she said. "I don't think I would like that. I want to see my teacher." The absence of a live, face-to-face instructor, the strangeness of the presentation format, and the different roles demanded of learners are factors that can create anxiety and discomfort in those who are more used to traditional classroom instruction. In addition, students may need to learn new computer skills as well.

In-service teachers bring a variety of expectations and backgrounds with them into professional development activities. Usually, these expectations are set by the patterns of traditional classroom instruction: an active, present instructor; teacher-directed activities and discussions; a passive or merely responsive role for learners. Web-based instruction tends to reverse these dynamics, making the instructor less present and increasing the interactive and self-directive roles of learners. We try to shift our students' expectations about their roles and experiences by increasing the amount of teamwork and problem solving they do with classmates and reducing their reliance on more conventional instructor-centered approaches. We design web conferencing activities to shift student expectations in three areas: participation, assignments, and student interaction.

Participation: From Passive to Active Learners

Collaboration requires students to be active learners. Students must learn to rely on themselves and on each other, both to learn to use the technology and to make up for the range of subtle directions, cues and information they normally receive from a live instructor. Since students taking their first distance-leaning classes are generally used to a more passive model of instruction, we begin the semester with a traditional, teacher-centered approach. We quickly move to a more learner-centered model as students become familiar and comfortable with the distance learning format and technology. For example, at the start of a course, we use e-mail rather than the web to communicate with students because most of them are already comfortable with this form of interaction. As the semester progresses, we require students to participate more actively and assign many team-based activities in SiteScape Forum so web-based communication and learner directed activities become integral parts of the class.

Assignments: From Directed Tasks to Self-Driven Tasks

In the past, we started a course out by encouraging students to use SSF without structure or direction for how to interact. We hoped that a free form type of dialogue would help students become familiar with SSF and develop more independence. However, the typical responses were short, sporadic and aimless, and students saw web interaction as an extra chore rather than as a space for meaningful work. To remedy this pattern, we develop weekly web activities that focus on specific teaching points and their applications. An early-semester activity might be to have each teacher list ten behaviors they observe in their schools that illustrate a particular concept from the text. An activity like this is simple and clearly contained, but it gives experience posting to the web and accessing discussion pages. As students increase their familiarity and expertise in using web conferencing, we assign activities where they choose the issues they will address and where they work collaboratively on projects and problem solving activities.

Interaction: From Non-Evaluative Sharing Toward True Collaboration

Perhaps the most important aim in using web-based instruction with teachers is to build collegiality and collaboration. Through careful nurturing of teams and teamwork, we are able to increase student ownership and support for learning and transfer many of the roles they normally expect of instructors to the group. We encourage students to use SSF to give each other advice and feedback both on course assignments and on everyday teaching situations. Teachers have a wealth of experience and expertise to share that goes beyond what instructors can provide. Unfortunately, in many web-based formats, students are reluctant to give genuine critical assessments of their peers' work and their interactions are frequently cursory or off-topic. To build toward collaboration, our first SSF assignments usually involve sharing work samples, describing teaching situations, and exchanging basic information. As students become more familiar with one another, we have

them provide suggestions and feedback to their teammates. Early in the semester we may ask them to suggest assessment procedures or devices their teammates could use before thinking about the methods they will use themselves. In this way, they can give and receive meaningful suggestions to incorporate into their own activities. By the end of a course, they are comfortable enough with each other and the web format to give critiques of each others' ideas.

Considerations for Using Web-based Conferencing

A major advantage of web conferencing is that it allows students to work in teams, a format particularly useful for building collaboration. We use teams of four-five students because this size seems to give students sufficient opportunities to view a variety of examples and suggestions from their teammates. It also insures that they do not have too many reading and replying tasks to do between classes. We vary the way we organize groups based on the course goals we want to achieve. We usually structure groups according to the following characteristics: members from the same or from varied schools, members from the same or from varied age/grade levels, members with varied skill/experience levels, or student self-selection of members.

Activities on the web are usually more demanding than conventional assignments, often because the instructor is not there to explain activities and assignments. We give clear and detailed directions on both the tasks and the type of interaction we expect. We provide students with a model of what we want them to do in the form of a case study, a sample worksheet, a task breakdown or other exemplar. We also give schedules and deadlines with each assignment. The first part of an assignment typically requires students to do a task posted by the instructor, and the second part might have them respond and give feedback to their teammates' postings. We stress the importance of making postings on time so teammates are not inconvenienced or prevented from completing their work.

We also give students feedback about the tasks they do on the web. SSF allows us to see everyone's postings and the times they are made. We often add postings to the class, a single team or an individual student. We can assess both student and team performance and offer suggestions or evaluative comments when needed. Additionally, we may give remedial information to a particular team, suggest ways that members can interact more effectively, give guidelines for response etiquette, encourage individual participation, or acknowledge good work. In these ways, we are able to build a more effective environment for students to interact with one another and support their professional development.

Conclusion

Web-based conferencing is a valuable tool for in-service teachers because it allows them to share experiences and concerns, engage in problem solving, and develop and test out new ideas. To use web conferencing effectively, instructors must consider the gap between the students' expectations about the learning process and the capabilities and characteristics of web-based instruction. Careful, gradual introduction of web-based technologies can guide and enhance the transition from a traditional model of instruction in which student roles are passive, to a model in which they take a full, active role in directing and achieving their own learning. Encouraging and building collaborative skills are key elements in this process.

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Case Studies of Primary School Teachers' Portfolios on Information Technology Competency Training Program – A Reflection on Information Technology Education for Teachers in Hong Kong

Kung, Eton
Instructor
Center for Enhanced Learning and Teaching
The Hong Kong University of Science and Technology

[Keywords]

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[Abstract]

The application of Information Technology in education has been strongly encouraged by the Hong Kong Special Administrative Region government since the outset of "Information technology for quality education: Five-year strategy 1998/99 to 2002/03" (Education and Manpower Bureau, 1998). Its primary aim was to promote information technology in education through teacher enablement, development of curriculum and software, hardware provision, and provide network infrastructure. According to the five-year strategy objectives, the promotion of IT in education is expected "to arouse and maintain our students' motivation to learn", "to broaden our students horizons, so as to enrich their learning experience and facilitate the development of a creative mind", and "to encourage independent lifelong learning and instil team spirit" (1998, p.1).

As school teachers are standing at the frontier of this change, there have been extensive training courses induced by the Education Department for "enabling" teachers' competency in using information technology in teaching and learning activities at three levels: "basic", "intermediate" and "upper intermediate". However, this policy has brought in controversial issues whereas many teachers training programs are ongoing. The issues include the effectiveness of ways of implementation of the training programs as well as lacking an objective and effective assessment system for assessing teachers' information technology competency. Under the policy, assessment of teachers' competency is only done in a school-based format, that is, every teacher has to submit a portfolio of work to the school principal illustrating their ability in using and applying information technology in their

teaching practice. However, there have been queries on the effectiveness of the training program formats as well as whether the quality of their portfolios is reflecting the teachers' competency for meeting the so-called benchmark.

This paper thus focuses on discussing the content and quality of primary school teachers' portfolios as a result of a particular "Basic IT" level training course ran by the Center for Enhanced Learning and Teaching, the Hong Kong University of Science and Technology. Case study approach was adopted for the sake of a close examination and exploration of the 15 chosen teachers' portfolios on their details. Since each portfolio consists of teaching schemes, lesson plans, multimedia teaching packages, etc., all these were analyzed with consent in terms of their subject matter, pedagogy adopted, presentation format and styles, relevancy and appropriateness to the expected teaching and learning situations, etc. Reflection report by each teacher, being part of the portfolio was also analyzed qualitatively for generating implications. Data derived from interviews with teachers also provided essential information for evaluating the training program and gaining a more thorough understanding of teachers' learning processes during the program as well as the processes of accomplishing their portfolios.

Results of analyzing the above data helped drawing implications on: the effectiveness of the format of information technology education for teachers; the effectiveness and formats of assessment system on teachers' information technology competency levels; the development of pedagogical strategies in relation to the application of information technology in teaching and learning activities; as well as the echoes to the general policy on information technology education for teachers in Hong Kong.

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Unobtrusive Digital Video Capture of Live Classroom Instruction

Chris LaMont, Arizona State University, US

Educational videographers face the challenge of recording actual classroom footage without getting in the way of the teaching. Conventional thinking takes one or more video cameras into a classroom setting, with a wireless microphone for the teacher and a boom microphone for student interaction, and records the lesson in real time. This method is very obtrusive. The team at Arizona State University's Technology Based Learning and Research has developed an unobtrusive video capture method. This innovative approach has met with great success and is changing classroom video practices.

Rather than seeing classroom footage as a single or dual camera video, where the two cameras are edited together to form some sort of cohesive lesson, the TBLR video team looked at videotaping a classroom more like a sports event. To achieve an event capture scenario, the first step was to employ multiple cameras. One or two cameras are fine if you are grabbing bits and pieces with extensive editing. The goal here was to walk out of a classroom with an hour of finished program that could be understood by anyone watching it. Capturing the feel and spirit of the instructional lesson was an important detail that should not be stifled with heavy equipment. The intent is to let the lesson and content stand on its own. This presentation will show a video demonstrating an unobtrusive method of digital video capture.

What Did We Learn in the Six Hybrid Courses?

Amy S. C. Leh, Ph. D.
Department of Science, Mathematics, and Technology Education
California State University San Bernardino
United States of America
aleh@csusb.edu

Abstract: The paper reports lessons learned in six hybrid courses during 1999 to 2001. The goal of the research was to investigate students' opinions toward such courses and to examine the impact of using different strategies on online communities. Data collection relied on online discussion messages, observations, interviews, and surveys. Both quantitative and qualitative methods were utilized in this study. The results revealed that students and the instructor were in favor of hybrid courses and that the use of moderating strategies greatly influenced online communities.

Introduction

Technology advancement is changing our society and shifting our educational paradigm. In the last few years, the number of online courses has increased dramatically, and offering online courses is currently a trend in education. "Online courses," "completely online courses," "web-based courses," "web supplement courses," "hybrid courses," and some other terminology are used by professionals. Some educators consider courses containing online features, such as synchronous or asynchronous communication, to be online courses. According to this definition, courses in which instructors use these features but still meet students on a regular basis would be considered to be online courses. Other educators, however, disagree and only view courses in which instructors meet students half or less than half of the regular scheduled meeting time during a semester/quarter to be online courses. Further, even other professionals only recognize courses in which instructors and students do not meet at all to be online courses. To avoid confusion, the author uses the expression "hybrid courses" in this article to refer to the courses in which an instructor and students meet for half or less than half of the regular scheduled meeting time. Such courses are the courses involved in this research.

In this article, the author first describes her hybrid courses offered during 1999-2001 and strategies used in these courses in order to help readers understand the structures of the courses. After that, she reports the action research including data collection, data analysis, and results. Discussions and recommendations are also provided in this article.

The Six Hybrid Courses

Grabowski (2001) has stated that instructional design is closely connected to the beliefs of the course designer. For instructors who view independent study as a primary goal, they might choose to structure an online course as all independent study. Students would receive credits as long as they complete course assignments during the semester, and no interaction with others would be a required part of the course. On the other hand, some educators consider interaction and communication to be essential aspects of a course. These educators might choose to design an online course in such a way that students have to participate in ample interactive activities with others, including their classmates.

The author supported the latter. She believed that social interaction plays an important role in learning (Vygotsky, 1978) and valued active learning and meaningful learning (Grabe & Grabe, 2001; Brown, 1992; Knapp & Glenn, 1996; Means et al., 1993). Agreeing with Palloff and Pratt (1999), she regarded an online community as crucial in a hybrid course and designed her courses in a way that her students had to interact with other students to enhance learning. In a manner similar to Oliva (2000) and Santema and Genang (2000), she encouraged students' active learning and invited students to construct

course materials together with her. She met her students four times throughout the quarter—twice at the beginning, in the middle, and at the end. All assignment submissions and discussions were conducted online via WebCT. She constructed a variety of forums (discussion boards) for students to communicate with each other and to share resources. Examples included forums for making announcements, asking questions and receiving help concerning technical issues, submitting assignments, and providing feedback and critiques to their classmates. In all her courses, students had to post their assignments to the forums, review assignments of their classmates, and critique each other's assignments. These activities provided students with basic channels for communication.

In addition to using assignments to enhance interaction, the instructor also employed different strategies to facilitate students' communication. While she used moderating strategies during the second year (2000-2001), she did not use them during the first year (1999-2000). During the fall quarter of 1999, all students conducted synchronous communication every week and discussed topics that were posted by the instructor. During the winter quarter of 1999, students used forums to conduct threaded discussion about topics generated by their classmates. During both quarters, students obtained participation points based on frequency and quality of their posted messages. They were aware that they had to post at least two messages every week to receive participation credits. Such participation requirements were not expected during the spring quarter of 1999.

During the second year, the instructor used moderating strategies in the three hybrid courses in which students took turns to moderate their online community for a week. It was understood that the instructor would not interrupt to answer questions unless it was necessary and that the students would receive credits based on how well they moderated the community. For example, if a question or a problem on a discussion board remained unanswered or not acted upon, the moderators of the week would be marked down. Moderators did not have to answer all questions or solve all problems but they needed to facilitate discussions about the issues within the community.

Based on responsibilities and tasks the students conducted, the moderating strategies varied. The instructor categorized them into three types of moderating: medium-duty, heavy-duty, and light-duty. During the fall quarter while the medium-duty moderating was conducted, moderators posted discussion topics, hosted online discussions, and answered questions posted by their classmates. During the winter quarter while the heavy-duty moderating was conducted, moderators not only took on the same responsibilities as in the previous quarter but also assigned readings, generated rubrics, and further evaluated their classmates' online performance. During the spring quarter while the light-duty moderating was conducted, moderators only needed to host online discussion and answer questions posted by their classmates.

The Research Study

The goals of the research were to investigate students' opinions toward hybrid courses and to examine the impact of using different strategies on online communities.

Subjects

The participants of the study were the students in the twelve hybrid classes (three courses offered at two campuses during two years). They were in-service teachers who were pursuing their Master's degree in Instructional Technology at a state university in the western United States and had little experience with hybrid courses.

Methodology

At the beginning of each course, the instructor explained to the students the course and their responsibilities, especially their duties related to the different strategies used in an online community. During the courses, the instructor posted questions for discussion. Examples of questions are: (1) What are benefits and barriers of hybrid courses? (2) What are advantages and disadvantages of conducting synchronous and asynchronous communication in hybrid courses? (3) Do you like the moderating

strategies used in this course? During the last meeting of each course, students filled in a survey that contained 10 Likert scale (1-4) questions and open-ended questions. The Likert scale questions were guided to examine the following points: (1) Compared to a traditional class, did students feel that they learned as much as, or even more, in the hybrid course? (2) Compared to a traditional class, did students feel that they spent as much as, or even more, time preparing for the class? (3) Compared to a traditional class, did students feel that they were motivated as much as, or even more, to learn in this course? (4) While taking the course, did students have sufficient access to the instructor? (5) While taking the course, did students have sufficient interaction with other students in this course? (6) Given the choice between traditional courses and hybrid courses, did students prefer a hybrid course if the course content were suitable for a hybrid course? (7) Did students wish that more hybrid courses were offered in the Masters program at the university? (8) Would students enjoy taking another hybrid course? (9) Were students concerned about the quality of hybrid courses? (10) Did students like the delivery format? (11) How many sessions in which the teacher and the students meet would be appropriate for a hybrid course? Open-ended questions of the first year focused on benefits and barriers of hybrid courses while those of the second year emphasized the impact of moderating on online communities.

In addition to online messages and surveys, data was also collected from observations and interviews. The author observed students and activities online as well as during class meetings. Interviews were informal and occurred when there was a need for clarifying students' comments.

The author tabulated the survey data. She also downloaded students' messages related to the research, color-coded messages, and categorized them into appropriate folders based on the topics, for example, benefits of web-based courses and barrier of web-based courses.

Results and Discussions

The results indicated that students were in favor of a hybrid course. The students felt that they learned as much as or more in such course than in traditional courses and that they were more motivated. They wished that more hybrid courses were offered in their academic program, and they preferred hybrid courses to traditional courses.

Most of the means of the survey results went up when time progressed. The instructor felt that this change was partially due to the experiences she and her students gained from the hybrid courses. She also felt that certain characteristics, such as self-disciplines, were necessary for people to succeed in such courses. Since the students and the instructor did not meet every week, students had to be self-disciplined and able to complete tasks without much supervision. More than half of the students revealed in their surveys and interviews that online learners should be self-disciplined and complete tasks on time. Four students who received incomplete grades during the first quarter pointed out a need of such characteristics. One said, "I have difficulty in the online [hybrid] course because I'm not so disciplined and often postpone my work. In a traditional course, I would be reminded every week when I go to class. But this is not the case for taking an online [hybrid] course."

Although people who tend to delay their work might have difficulty surviving in hybrid or online courses, the instructor believed that preparing students' mindset before they took such courses could be helpful. During the first meeting of her courses, therefore she asked students who had taken her hybrid course(s) before to share with other students tips of being online learners. "Don't postpone your work" was mentioned repeatedly by the students.

As mentioned earlier, students conducted synchronous communication in the first course and asynchronous communication in the second course. In both courses, students received participation credits. In the third class, asynchronous communication was utilized but no participation credit was issued. The different strategies used in these three classes had an impact on the online communities. The research results indicated that synchronous communication strengthened students' sense of belonging. A student stated, "Although we do not see each other every week, the real-time communication makes me feel we belong to the same class." Such a sense of belonging was less common when asynchronous communication was used during the second quarter. During that quarter, a few students addressed that they missed real-time communication and requested the instructor to sometimes conduct such communication while they were enjoying the flexibility that asynchronous communication provided. Observing the three courses, the instructor found that the online community of the third course seemed to be loose and thought that issuing no participation credits might have contributed to the loose community. The instructor

suggests online instructors employ asynchronous communication and synchronous communication alternatively and use participation credits to motivate students participating in online communities.

Students listed several benefits of a hybrid course: flexible schedule, being able to work at any time and at any place, and being able to choose the best conditions for learning. They also mentioned that hybrid courses saved them gas and time on commuting and allowed them more access to instructor and to their fellow classmates.

Barriers also existed in a hybrid course. The participants missed face-to-face communication and personal contact. Students with low technology skills felt pressured and anxious. Such pressure and anxiety might create a negative impact on learning. Despite these barriers, students expressed that they would still choose a hybrid course over a traditional one, if they had an option.

Like the students, the instructor enjoyed the flexibility hybrid courses provided and missed face-to-face contact with her students. Unlike the students, she experienced tremendous pressure of responding to students' messages and of their expectations of receiving responses instantly. Meeting students once a week in a traditional course became meeting students 24 hours a day, seven days a week online. In addition, it was time consuming and stressful to communicate with a couple of students who often got confused and repeatedly asked the same questions no matter how clear information was, for example, on when an assignment was due and when the next meeting would be. Such stress was eased during the second year when moderating was used in her courses.

During 2000-2001, the instructor utilized medium-duty moderating in the first (fall) quarter, heavy-duty moderating in the second (winter), and light-duty moderating in the third (spring) quarter. As mentioned earlier, the differences among the three types of moderating were based on responsibilities and tasks students conducted in the hybrid courses. Data collected from survey open-ended questions, online discussions, observations, and interviews indicated that both the students and the instructor favored the use of moderating in the courses. The students felt a sense of ownership of their online communities and learned from their peers by observing how their peers hosted the communities. They received answers much faster than before because every member of the communities tried to help answer questions. The instructor also favored the moderating. She noticed that she was less stressed responding to students compared to the first year and that the students received responses faster and became very active in the online communities. The communities became very dynamic, and she felt the courses sometimes could smoothly move forward like a car with a "cruise control."

Among the three different moderating strategies, the students favored the medium-duty moderating the most and the heavy-duty moderating the least. During the winter (heavy-duty) quarter, the responsibilities of the students and their activities appeared too complicated. Moderators of every week tried to do a good job by assigning readings, setting objectives for the week, and facilitating discussion; often their readings and objectives were too many to be accomplished within a week. Students conducted many different activities when time moved on. At the end, they were distracted by the objectives of different moderators and forgot the objectives of the course. In addition, moderators often had to participate in activities of a week while they were still evaluating their peers' online performance of the week when they were the moderators. This was indeed a hectic quarter, and the instructor learned a big lesson from the experience. Appropriate amount of online communication could enhance learning while too much communication might cause learners to withdraw from the community (Palloff & Pratt, 1999). Students' dislike of such moderating is clearly revealed in the survey results. A number of the means during the winter quarter dropped and consistently appeared to be the lowest among the three courses. Students spent a lot of time (mean=3.93) on the course but did not necessarily learn more (mean=3.15). They liked the course the least (mean=3.27) compared to the other two courses of the year.

Although the winter quarter was hectic, students still favored hybrid courses. Issues addressed during the first year, such as benefits of such courses and their wish to have more hybrid courses in the academic program, repeatedly appeared in the second year. Students also liked the fact that they had to post their assignments and review their peers' work. By doing so, they learned much from their peers. They liked meeting three to four times per quarter and did not seem to favor an online course without a face-to-face meeting.

A hybrid course did provide flexibility and convenience to learners, especially to learners at remote areas. While hybrid courses are blooming in many places, the author thinks that hybrid courses should not (1) be independent studies in which no interaction among students are necessary, (2) be only task-oriented in which social learning is neglected, and (3) lower the quality of education. Instead, the courses should be structured to raise the quality of education because learners have options to choose their

best learning conditions and opportunities to enhance their learning using resources beyond boundaries of time and space.

Conclusion

The paper reports action research on online courses conducted from 1999 to 2001. Data were collected from three courses (12 course sections) at two campuses during the two years. Data collection relied on online discussions, observations, interviews and surveys. Both qualitative and quantitative research methods were used in this study.

The results indicated that students and the instructor were in favor of hybrid courses and that the use of different strategies had an impact on online communities. Using synchronous communication and asynchronous communication alternatively could enrich online communities, and moderating strategies with careful design and organization worked well in hybrid courses.

Instructors who employ a variety of strategies to build up and nurture an online community may achieve the most success with hybrid courses. This new delivery method provides students with options of choosing their best learning conditions and with opportunities to enhance their learning using resources beyond boundaries of time and space. One can see the potential of this method for positive impacts on our education and society.

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TNT: Ignite Leaning Exploding Barriers and Obstacles to Language Learning

Dr. Donna Lenaghan -Educational Computing and Technology
Barry University, USA dlenaghan@mail.barry.edu

Abstract: In the statement, "All students can learn and be All Star learners" there is no qualifier -- "as long as English is their first language". The challenge is to identify: how to ignite learning in all learners especially learners with limited English language proficiency and the nuances of learning for all learners? This paper provides: 1) a topical review of Teaching English to Speakers of Other Languages (TESOL), 2) a synopsis of brain-based teaching and learning concepts, 3) a discussion of an instructional design model for infusion of technology resources to augment the teaching and learning process for students with limited English, and 4) a sampling of technology resources for infusing appropriate technology into the teaching and learning process for students with limited English.

The TNT Combination for Learning

TNT (an abbreviation of trinitrotoluene) is a commonly known explosive created by combining three nitro groups into one module (Websters, p.2401 & 2446). Under most conditions, TNT is stable, yet when the three elements are combined in a certain way it becomes a powerful charge to blow away obstacles and barriers to progress. TNT for learning means--Technology Nourishes TESOL learners. It removes barriers and obstacles to learning.

The three parts of the educational TNT are: TESOL/ESL, brain-based learning, and instructional design for infusing technology into the teaching and learning process. TESOL is the field of Teaching English to Speakers of Other Languages and ESL is English as a Second Language. Brain based learning means that strategies and techniques consistent with brain operations are integral parts of the teaching and learning process. Educational Technology is the application of science (in this case computer-based technologies) to learning. A quick review of the literature in each area provides a foundation for understanding this powerful combination to remove obstacles for learning.

TESOL/ESL

Numerous web sites for TESOL/ESL learners and the history of Computer Assisted Language Learners (CALL), demonstrate that technology is not a new concept in the TESOL/ESL arena. When and how technology can be infused to remove barriers for learning is an area for continual and rigorous discussion and investigation by educators and researchers. A selective (not exhaustive but representative) sampling of literature found the following common elements within articles discussing TESOL/ESL and technology: 1) numerous suggestions for types of technology activities to use by or with second language learners, 2) suggestions for the appropriate incorporation of technology into curricula and pedagogy and 3) recommended components of TESOL/ESL learning activities. Suggestions for TESOL/ESL learning activities with technology are found later in this paper

Shared components of TESOL/ESL activities found in the literature included: language development/acquisition, pedagogy to support social communications competencies and academic achievement, contextualization, and cultural influences in second language acquisition (Bowman, Butler-Pascoe, Chapelle, Egbert & Hanson-Smith, & Warschauer). Incorporating technology as a part of the curricula and integrated into pedagogical goals was a common thread found across the literature review. For example, Vazquez-Montilla's & Zhu's (2000, p.17) research comparing the use of web based conferences and e-mail communications for ESL students found that "technology remains an enabler and facilitator or instruction" when it is infused as a part of the pedagogy. Technology should be used to enhance the language learning process. It is a means to the outcome of language learning not an outcome itself. Similar opinions were found in the web-based bulletin board discussion of Computer Technology and TESOL (Healey 2001). Of the pro-technology postings, individuals advocated or documented technology as a part of the teaching and learning process not something to be learned by itself. Douglas, in review of Computer Assisted Language Learning (CALL) resources, postulated that the effective use of technology in language learning requires "putting pedagogy before technology" (Douglas, 2000). Based on her research on using Internet with second language learners, Lynda Terrill (2000) identified benefits and disbenefits of adults learning English with technology. One benefit was that learners enjoy working on the computer. The disbenefits included the language level on the Internet being too difficult for second language learners, limited or no Internet access (also

cited by others in the literature), and lower socioeconomic groups unfamiliarity with or limited access to computers.

Warschauer (1998) posed the most provocative perspective about using technology in second language instruction. He advocated for a holistic re-examination of what literacy means in a multimedia communication culture and how this literacy intersects with class, race, gender and cultural identities. He raised the question of examining how the sociocultural context of a particular educational institution or community effects electronic illiteracies. He advocated that the perspective shouldn't be "old language learning plus computers" (Warschauer, 2000, p.2) but what does language-learning literacy in a technological communications period mean.

Brain Based Learning Variables

Brain based learning is a term for strategies that complement how the brain naturally functions (Caine, 1994; Lenaghan, 1999; Sylwester 1999). The brain based learning strategies to be addressed in this paper are: intellectual potential (multiple intelligences) and brain operations.

Intellectual Potential = Multiple Intelligences

Howard Gardner revolutionized educators' understanding of the brain's potential through his Multiple Intelligences theory and definitions of intelligences. He redefined intelligence as "the ability to solve problems or to make something that is valued in one or more cultures" (Checkley, 1977, p.9). This definition has grand potential for multilingual and multicultural learners. It is inclusive and not restrictive to one culture's dominant language. According to Gardner, students are smart in a combination of at least eight different areas. Multiple Intelligences theory is not to be used to classify people, but to understand, plan, and evaluate the teaching and learning process. Each person has two or three dominant intelligences that he or she uses to complete daily tasks, solve problems and respond in stressful situations. Teachers should provide multiple opportunities for students to learn, demonstrate and reinforce their learning through all these intelligences. A sampling of Internet activities and sites related to individual intelligences and TESOL are listed in Table 1.

Table 1: Multiple Intelligences and Internet Activities

Intelligences	Ability to create or use…	Internet Activities
Linguistic	Language, words and verbal expressions	Word Searches, Oral Drill Sites, Passive Voice Practice, Grammar Blast, Illustrated Story Books, Text Translators, Grammar & Poetry Sites, Proof reading and Spell-checking sites, On-line Dictionaries, Foreign Language Resource Center, Cross-word Puzzles, Poetry Sites, Newsgroups, List Servers, e-mail, Chat Rooms, On-line journals, Bulletin Boards
Logical-Mathematical	Sequential, deductive logic and reason, math and science	Math activity sites, Mathforums, Access data bases, data analysis, math and scientific gaming simulations, Graphic calculators, geometer sketchpad
Spatial	Colors, holistic and contextual relations	Museum tours, virtual reality sites, Clip art, graphical displays sites, Desktop publishing, Graphic organizers
Bodily-Kinesthetic	Coordinated hands and body movement	Virtual dissection, Educational games, Lego Logo, Olympics coverage, Centers for Health, keyboarding
Musical	Hear and create music sounds & patterns	Music on the Web, sound files with various texts, digital recording and orchestration
Intrapersonal	Self-understanding	Personal Home Pages, Portfolios, Journals
Interpersonal	Influence, and produce with others	Electronic family histories, Telementoring, On-line discussion, Electronic villages, and CyberPals
Naturalistic	Discriminate and sensitivity to nature	Science & nature exploration sites, Natural virtual field trips, ecology & environmental Sites

Brain Operations

Multiple Intelligences describes the brain's capacities and brain operations describe the natural functioning or neural pathways of learning. Through brain mapping (observing and analyzing the neuron firings in human brains) the biological paths and processes for learning are identified. Emerging from this research, are five key insights for education (Table 2)and strengths of technology related to these brain-based learning techniques (Table 3).

Table 2: Brain and Learning

Brain Based Learning

The emotional brain is the preliminary processor of information thus the gateway to learning.
Neural pathways of previous learning are established through repetition.
Short-term memory storage capacity is limited. Information must be manipulated or applied for transfer from short-term to long-term memory.
New information and experiences shape neural pathways established by prior learning.
Problem based learning requires active neural connections across and between numerous memory & activity centers.
Brains operate on a ninety-minute energy cycle then needs a break.

(Source: Hannaford, C. 1993; Sylwester, 1995)

Table 3: Linkages of Brain-Based Learning with Technology

Brain Based Learning	Technology Assisted Learning
Affective Learning	It is fun, novel and students feel in control. Most Internet sites require students to hear, see and do the content.
Neural networks reinforced through repetition	Consistent communication protocols reinforce linear thinking process in some areas (not the Internet). Information may be repeated and summarized in novel and engaging ways
Concepts learned must be used for transfer from short term to long term memory	Active manipulation of data and/or skills on a site requires learners to do something with the information, thus aiding the transfer from short term into long-term memory.
New learning builds on past learning networks	Instructional design and hypertext allow learners to start and review basic concepts and build upon those with additional links.
Problem Based learning requires cross-brain neural activities	Many Internet activities are contextual and problem based-requiring students to research an issue, manipulate data, synthesize and/or evaluate information. This requires brain activity across different brain operations and memory centers.
Ninety minute energy cycle of the brain	Activities and stimuli change so frequently in Internet and software programs that the sensory habituation is less noticeable.

Instructional Design

Instructional design is defined as the systematic planning of ways to accomplish objectives, outcomes and/or learning. It is driven by the instructor's (and hopefully learners) philosophy of learning and theories and technologies to accomplish this. The pedagogy mentioned in the TESOL/ESL literature infers an instructional design process. With infusion of technology into teaching and learning activities, the manner in which the technology (instructor and/or student driven) is used and the design of the actual software (concept presentation/programs were written with an inherent pedagogy) must complement and expand the teachers' and learners' philosophy and learning opportunities.

Infusing technology into the learning environment changes the learning environment. Like Warschauer's question of the meaning of literacy in a multimedia communication culture, the educational technology field is asking itself the meaning or process of literacy in a multimedia culture. The question of meaning is still being debated, but the methods consistently reflect the trend of learning becoming more student directed, oriented to problem or solution seeking, cooperative learning, discovery-focused, and individualized. Teachers and students are cooperatively learning, producing knowledge and solving problems together.

Technologically based learning and instruction are initially attractive (once fear of the dreaded computer monster is tamed) because it appeals to one or more of the dominant senses and intelligences. The learner actively seeks information and solves problems in virtually realistic environments and the teacher coaches. This is a shift from "sage on the stage" to "guide on the side", facilitated by appropriate technology. A powerful paradigm shift is occurring with technology-based learning. Teachers are no longer the absolute source of knowledge, but a designer of learning experiences in which the learners actively seek, use and synthesize knowledge. This shift is exploding some barriers and obstacles to learning.

There are many wonderful frameworks for instructional design. Readers and practitioners should adopt or adapt one consistent with their educational values and preferred teaching methodologies. Many teachers and professors have found Multigogy effective with multicultural and multilingual learners. The acronym M.U.L.T.I. (Many Unique Learning Tendencies Impact) is its prefix (precursor for understanding) to which the Greek root "gogy" (which means teaching) is added. Multigogy is a framework for designing instruction that is learner centered and brain-based. It accommodates a variety of instructional techniques supporting Directed Instruction, Cognitive Constructivists and Social Learning Constructivists theories of learning (Lenaghan, 1999).

Two Multigogy principles--FAST SCORE--are consistent with successful learning strategies found in the

TESOL/ESL literature. FAST is an acronym prescribing the learning environment conditions to be: Friendly, Active, Solution-oriented and Technologically assisted. SCORE is an acronym summarizing brain based learning principles. To SCORE a learning module, the teacher and/or learner: 1) Sees the information in addition to hearing it; 2) Chunks or categories the information into small units to easy the retrieval and retention; 3) Operates the information in some manner in order to reinforce neural networks and facilitate transfer from short term to long term memory; 4) Repeats or reviews concepts and skills to enhance retention; and 5) Emotionalizes (positively) the learning content and context. Remembering FAST SCORE to enhance the instructional design and lesson planning process and combined with Multiple Intelligences orientation will set-up learners to be All-Star learners.

Infusion of Technology

Infusion of technology into the instructional design for learning has a range of instructional methods options. Most people agree that its purpose is to accomplish standards of competencies and benchmarks prescribing enhanced thinking and concept mastery. And they accept a variety of different approaches for incorporating technology into instruction. TIP MIC, an acronym within Multigogy, is offered as a summary of the variety of ways technology is infused into the teaching and learning process (Table 4). A sampling of tips and ways to infuse technology into TESOL/ESL activities are listed in Table 5.

Table 4: TIP MIC for Infusion

TIP MIC	
Technology	Technology is a tool to deliver instruction and/or engage, equip, inspire and support individual learners
Information	Information is presented and/or accessed with contextualization in a realistic replicated environments with or without the Internet
Production	Production of products and/or problem solutions with technology
Multi-modal	Many unique learning tendencies (multiple intelligences, five learning styles and diverse languages and cultures) are addressed with technology
Internet	Internet is a medium for teachers and students to research, produce, and publish
Communications	Communication (text or visuals) exchanges –synchronous and asynchronous—are possible through intra and internets

Table 5: Sampling of Tips to Infuse Technology Into TES/ESL

TESOL/ESOL Techniques	Sampling of Tips & Technology Infused into TESOL/
Repetition	Drill and Practice Software, Educational Games, Electronic Flash Cards
Oral Expression	Language translators, Say & Learn Programs, Word Processing, Journals
Listen to Sounds of printed work	Recorded voices and sound in Hyperstudio and PowerPoint presentations
Concepts Visual Presentations	Clip Art, Hyperstudio, PowerPoint, Internet, Desktop Publishing
Drill & Practice	Variety of topical software and Internet Sites.
Immediate Success	Developmental appropriate software is available and designed for scaffolding of learning. This is critical to ensure competent and consistent operations of technology so insure that it does not impede learning
Individualized Learning	Integrated Learning Systems and tutorial software have different levels of concept mastery and one can control the speed of presentation
Contextual Learning	With the Internet, the World may be the context of learning. Concepts presented with auditory and visual cues in virtual and real environments
Cooperative learning	Learners work together to research, create, produce, edit, brainstorm and evaluate each others' work
Social Communications	On-line communications (bulletin boards, chats, conferences and e-mails—synchronous or asynchronous) can supplement (should not replace) person-to-person communications. Reluctant speakers or intrapersonal intellects may become very linguistic with on-line communications
Cultural Expressions	Technology has the capacity to replicate, communicate and create cultural expressions ;')

(Note: TESOL/ESL techniques paraphrased from Claire & Haynes (1995) &Butler-Pascoe (1992)

Specific TESOL/ESL websites recommended by practicing teachers (organized into categories of Teacher/Instructional, General ESL/TESOL and Student Activities sites) are found at http://socrates.barry.edu/ADSOE-dlenaghan/tesol/webresources.htm. Readers are encouraged to complete focus groups to validate and expand this list for your specific multi-lingual and multi-cultural contexts and share their findings with others.

Conclusion

The three elements in our TNT for learning are: TESOL/TNT teaching and learning strategies, brain based learning concepts and instructional design. When combined with technology as a tool wisely infused in the teaching and learning process, the mixture becomes a powerful catalyst to blow away barriers and obstacles to learning. This dynamic mixture is more than knowing the independent compounds; it is in the creative and careful blend of the three elements into one module that creates the positively dynamic potential. With the potential to explode barriers and obstacles, the field is now clear to engage all learning capacities with the infusion of technology into TESOL for the success of students and teachers.

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Using Moral Development Theory to Teach K-12 Cyber Ethics

Judith Lewandowski, Purdue University, US

Introduction

Children today face a very different world than that of their parents. A recent television commercial exemplifies this point by illustrating a young teen who, after disobeying her parents, is grounded from the use of the telephone. The commercial depicts the girl joking with her friend, through the use of an Internet-based phone, about the "punishment" she has received. Much to the chagrin of the teen, her mother enters the room and overhears the conversation. Without hesitation, the mother extends the punishment to include banishment from the computer.

Technology, it seems, has permeated into virtually all aspects of our life. Its incorporation has influenced the way in which we communicate, travel, work, learn, and raise our children. Consider the life span of young teenagers born in 1988. For these kids, it is common practice to chat with friends from around the world, watch news events as they happen, interact with experts via the Internet, capture photos digitally, and manipulate historical recordings of events. The environment in which these children will grow is quite different than that of their parents. All of these differences resonate the fact that the skill set that will be required of these children as they mature into adults is dramatically diverse than the skills that were needed by previous generations.

New Societal Skill Set

The role of information technology in our society is increasing at a dramatic rate. According to several governmental reports, there is currently a "critical" need for individuals skilled in the field of information technology. These reports also indicate that this need will grow substantially over the next five years (Critical Infrastructure Assurance Office, 2000). According to a recent National Science Foundation report, by the year 2010, the United States will need more than 700,000 additional scientists and engineers proficient in both content and technical skills (Kopp, 1996). The skills of the past will no longer provide an individual with a secure future. As the needs of our society change, so must our educational system.

Effective and consistent technology use is a critical factor in increasing the information literacy levels of our future workforce. Currently, the amount of knowledge in our world doubles every two years (Withrow, 1993). Consequently, it would be impossible for a worker in the 21st century to memorize all relevant information. Due to this vast amount of knowledge, information literacy skills will need to become a key component of our schools' curriculum. The ability to find, locate, and apply the needed information will require information literacy skills as well as basic technical proficiencies (Withrow, 1993).

According to John Brown (2000), the Internet has the potential to assist in the acquisition of the "new" skills. The use of technology in an educational setting can provide a dynamic framework to enhance and promote the acquisition of the types of skills that our students will need in order to be productive in the future. Technology, in a variety of forms, can help to teach students the process of information gathering, inquiry, collaboration, and simulation (Rice & Wilson, 1999).

Educators, politicians, and parents agree with the idea that technology integration will help to spur the advancement of technological skills in children. This belief has been transformed into school budgets that embrace the integration of technology into the classrooms. The National Center for Education Statistics reports that 66% of public school teachers use computers or the Internet for instruction during class time (2000). According to a 1999 survey, 16 million children (or 14% of U.S. citizens under the age of 18) regularly use the Internet. Of those users, 6 million are children under the age of 6 (Curriculum Review, 1999).

Acquisition of Ethical Guidelines in the Workplace

Familiarity with and utilization of new technical advances are critical components of an educated 21st Century workforce. However, the development of a new skill set goes far beyond simple technical know-how. The Information Technology (IT) workforce must also understand the ethical implications of the programs they write, the actions they take, and the criticality of protecting intellectual property in the online environment. Individuals who learn only the technical side of technology are missing an integral part of the new skill set.

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Unethical behavior can be a costly mistake for industries to counteract on several levels. Fines, public embarrassment, negative publicity, professional reputation damage, low employee morale, and difficulty in employee recruitment are all examples of common costs associated with unethical business practices (Nash, 1993). Lands' End, a prominent clothing manufacturer, offers a dramatic example of a commitment to include ethical training as part of the new skill set required of its employees. Members of the Lands' End Information Technology team are routinely placed under security audits which include technical attacks on its information security practices as well as individual ethical tests of the team members (Wilder & Soat, 2001). By utilizing this type of spontaneous performance check, Lands' End is actively working to develop and maintain a workforce that is both secure and ethical in its daily practice. Additionally, a recent Information Week survey indicated that 62% of the reporting corporations monitor their employees use of the WWW, and 54% monitor the email of their employees (Wilder & Soat, 2001). These monitoring practices are deemed both ethical and common by most IT professionals, yet it is not clear as to where the employees are to acquire these skills for discerning appropriate use of the technology.

The nature of the IT world changes the use of ethical behavior for some. In the invisible online world where you can interact almost anonymously, some individuals experience difficulty in translating their real-world ethical guidelines into the online environment. When individuals interact in a direct face-to-face manner, they can see the impact their dialogue is creating. In the online environment, individuals can send dramatic, painful, and derogatory responses without having to witness the pain the receiver endures (DeMaio, 1991).

Acquisition of Ethical Guidelines in Schools

It is imperative that students understand the deep implications that their online behavior may have upon others. If they are unable to draw the connection between real-world ethics and the online environment, the students will need to be guided in this transition by role models, parents, and teachers. Ethical training can benefit students by "increasing their awareness and sensitivity to important issues surrounding ethical problem solving" (Windsor & Cappel, 1999). To this end, it is critical that cyber ethics be addressed as part of the regular curriculum of our K-12 schools. As we teach students the skills to use technology, we must also teach them the proper guidelines for appropriate use.

Ethics and Cyber Ethics Defined

According to the American Heritage Dictionary, "ethics" refers to the set of principles of right conduct (2001). It is "concern with what we consider to be 'right' or 'just' behavior (Gibney, 1999, p.19). Ethics refers to the guiding principles or ideals of good vs. evil. Ethics are not based in law, religion, or standardized beliefs; rather, ethics refer to a general conception of right and wrong which transcend both religion and law (Webster's Dictionary, 2001). "Cyber ethics" refers to the application of ethics into the online or virtual environment (Ethics Connection, 2000).

Justification of Cyber Ethics at the K-12 Level

Ethics intervention demands attention at a young age. The majority of children begin developing significant use of their ethical principles between the ages of 10 and 12 (Geide, et al 2000). To hesitate in teaching ethical principles until adulthood is not only ineffective but also risky. There are countless examples of the horror stories of students who once empowered with technical skills feel the need to practice them in inappropriate ways. Distribution of pornography, sexual harassment, credit card theft, destruction of governmental websites, modification of grades, counterfeiting rings, and software piracy are just a few of the technically-based illegal activities with which students in our schools have been involved (Marsh, 2000)

In addition, common classroom distractions have even been impacted by technology, often with a more vicious twist. One prominent example involves the illegal use of others' email accounts to send inappropriate, threatening, or mean email to fellow classmates. This practice has become so commonplace in schools, that many middle school teachers trivialize it by making it analogous to passing hand written notes about the "un-cool kids" in class (Marsh, 2000).

Not only are students not hearing about the need for appropriate use of technology, it seems that they are bombarded by a constant stream of media clips in which the image of the hacker is portrayed as a romanticized rebel. MTV recently aired a broadcast entitled, "Hackers" which provided the viewer with a day-in-the-life view of a computer hacker. Additionally, several major motion pictures such as "Hackers," "War Games," and "Real Genius" have depicted hackers as the new adventure seekers. The actual hackers

do not dissuade these stereotypes; rather, they embrace the notoriety and acclaim the stereotype brings (Governor, 1997).

As technology integration has progressed throughout society over the last several years, it is also interesting to note that the frequency of computer crimes and misuse has also dramatically risen. Specifically, the 2000 Computer Security Institute/FBI Computer Crime and Security Survey indicates that computer crime and other information security breaches are on the rise with 90 percent of the responding 585 participants reporting computer security violations within the previous 12-month period (Smith, 2000). Many experts agree that this trend in increasing rates of computer crime will escalate even further. The consensus from a recent Department of Justice conference on computer-related crime was that due to the increased integration of computers into the K-12 learning environment, the number of potential perpetrators of this type of crime will rise dramatically (Smith, 2000). According to this group, the basic adventurous nature of technology can lead undirected users to misuse the equipment (Sivin & Bialo, 1992).

Other research echoes this sentiment on a more youthful level. In April of 2000, Scholastic, Inc. conducted a survey asking 47,235 elementary and middle school students if hacking should be considered a crime. Alarmingly, 48 percent of the surveyed students reported that it was not criminal (Geide, et al, 2000). Additionally, in a study of 729 high school students conducted by Vincent & Meche (2001), 19 percent of the students indicated that they felt that personal use of company e-mail (designated for company use only) was ethical and 49 percent said that they would use it.

It appears that schools are providing students with the opportunity to develop and learn the skills to use technology; yet, this same curriculum is failing to teach the students the principles surrounding the acceptable use of technology. It is the lack of instruction on these soft skills in the curriculum that has many experts worried about the propagating culture of young Internet users (Geide, et al, 2000).

Society is a dynamic system. It must, by nature, evolve in order to survive. As we develop the new definitions of appropriate behavior in the online environment it is imperative that many members of society be engaged in this ongoing dialogue. An informed community and active discussion of ethical issues will enable society to determine civil and just manners to deal with the nuances of technological advancement (Rezmierski, 1992). By opening this dialogue within the K-12 environment, teachers will be able to prepare students to understand the proper use of technology and explore the issues that will continue to unfold. Unfortunately, many educators are not equipped with the skills to effectively integrate ethics into their classrooms. In order to successfully blend ethical instruction into the K-12 curriculum, educators must develop an understanding of moral development principles, recognize age-appropriate moral dissonance, and learn to advocate for the moral growth of the students' perspectives (Clare, et al, 1996).

The remaining portions of this paper provides a general overview of prominent moral development theories. Its purpose is to provide a general understanding of moral development theories as well as the justification for the selection of Kohlbergian theories as the foundational approach to the integration of cyber ethics into the K-12 curriculum.

Learning Environments in Adult Teacher Education - a Chydenius Implementation

Jukka Mäki
Project Manager
Network University
Chydenius Institute
University of Jyväskylä
Finland
jukka.maki@chydenius.fi

Abstract: Chydenius Institute is a research and educ ation centre of the University of Jyväskylä. It's the only educational department in Finland that selects only adult students for graduate teacher education. This paper raises the problems of adult-students in the use of information technology in studies. It describes especially the use of web-based learning environments as part of their studies.

1. Chydenius Institute, a Network University for Adults

Chydenius Institute is a research and education centre of the University of Jyväskylä. Located in Kokkola, in the western coast of Finland, it gives a regional stample of the University. The Chydenius Institute offers teacher training and in-service training for professional development, makes research in the fields of economics, social and pedagogical sciences, offers open university education and services for businesses and other organizations. It offers also Master's degrees of Information Technology (with University of Jyväskylä) and Electronic Engineering (with University of Oulu). Its newest implementation is European Union -funded project of Network University, which is part of the Finnish Virtual University.

Chydenius Institute has a reputation as a Network University for adults. The history begins from mid 80's, when the Institute was founded firstly to give further education for teachers in the region. The name Chydenius comes from Anders Chydenius who was a famous Finnish politician and economist in 1700's supporting liberal economic policy and freedom.

In the late 1980's there was a lack of elementary school teachers in Finland and that's why the Ministry of Education gave an emergency law for some universities to start a two-year-program of teacher training. The entrance to study was given for those teachers who had long teaching experience, university studies, but who hadn't finished a Master's degree of Education. The Chydenius Institute was one of those training units.

Shortly, the lack of teachers was covered, but it became evident that Finland needs this kind of adult teacher education. The Ministry gave the permission for the Chydenius Institute, as a part of Jyväskylä University, to offer permanently instruction using this model of teacher training. And so today, the Chydenius Institute is the only unit that gives "adult teacher training" in Finland. In 2001 every fourth candidate was taken to study, i.e. 50 students started in the fall 2002.

2. The students of teacher training

The "typical" student of Chydenius Teacher Education is married woman with two children, owner of another degree (usually kindergarten teacher) and five to seven years of experience in elementary school teaching. Most often she has a home not more faraway than 200 kilometers from Chydenius Institute. She dedicates her time for studies every week and the husband takes care of the family. Usually she stays the weekends at home. This kind of organizing the life totally differently, although temporarily, means a big understanding from the side of the family but also a maturity and motivation of the student.

3. The studies of teacher training at Chydenius Institute

The teacher training at Chydenius Institute consists full-time studies from 1.5 to 2.5 years. Because the most of the students are holders of another university degree or at least they have 60 credits (of 160 cr.) of university studies. A student completes the studies by having Lnaguage and communication studies (7 cr), Science of Education as major (75 cr), minor studies (65-70 cr) and optional studies (13 cr). Everybody makes a scientific research of 22 credits (counted in major studies).

All the students are adults with teaching experience. The studies support life-long learning and they are student-centered and flexible. Everyone has an individual curriculum for Master's degree. All the courses give possibilities for team working, personal counseling, projects, workshops and seminars. Often the assignments are implemented individually, pairs or in small groups. Pedagogical theory and practice are in close interaction and the students are able to develop their teaching abilities during their studies.

4. The use of ICT

Because of high level of Finnish educational system and big use of information technology, all university studies consist computers, internet, electronic communication and videoconferencing. The Chydenius students have very different background in ICT. This might to be a problem, but actually it isn't because of big emphasis that is given to ICT as a part of studies. During the first weeks of the two-year-program the students start their computer training. This is seen as a basic for the further studies. They learn to use the computer, word-processing, graphics, presentations, email and internet. They learn to take digital pictures, scanning and image-processing. During every course the students use open or closed web-based learning environments to perform their assignments but also to communicate and inform one another, both students and professors. Table 1 shows the special courses of ICT during the studies.

CODE	STUDIES	CREDITS
CKI081	ICT-knowledge of a teacher	2 cr
CAM481	Media education	2 cr
CAM570	Pedagogy of teaching with networks	2 cr

Table 1. The special courses of ICT in Chydenius teacher education studies.

The course "ICT-knowledge of a teacher" is a basic course for using computer, network, word-processing, email, internet and graphics. The students learn also to process digital photos. All students come familiar with pedagogical use of videoconferencing and www-page design.

The course "Media education" helps the students to understand media reality of today and phenomena of mass media. They get experiences of communication and media culture. They analyze the views and opportunities of media education. They learn to edit digital photos and videos and evaluate illustrated learning material in www and traditional forms.

The course "Pedagogy of teaching with networks" emphasizes the meaning of human, knowledge and learning as a basis for pedagogical use of ICT. The students think the role of a teacher as a tutor in problem-based learning. They learn to create web-based courses and to build communities in a web-course.

Throughout all the studies internet is utilized as a source of information for every course. Because all Finnish schools are connected to internet it's very important to learn how to use the internet in education. In the region where Chydenius-Institute is influencing and the practice of teacher training is

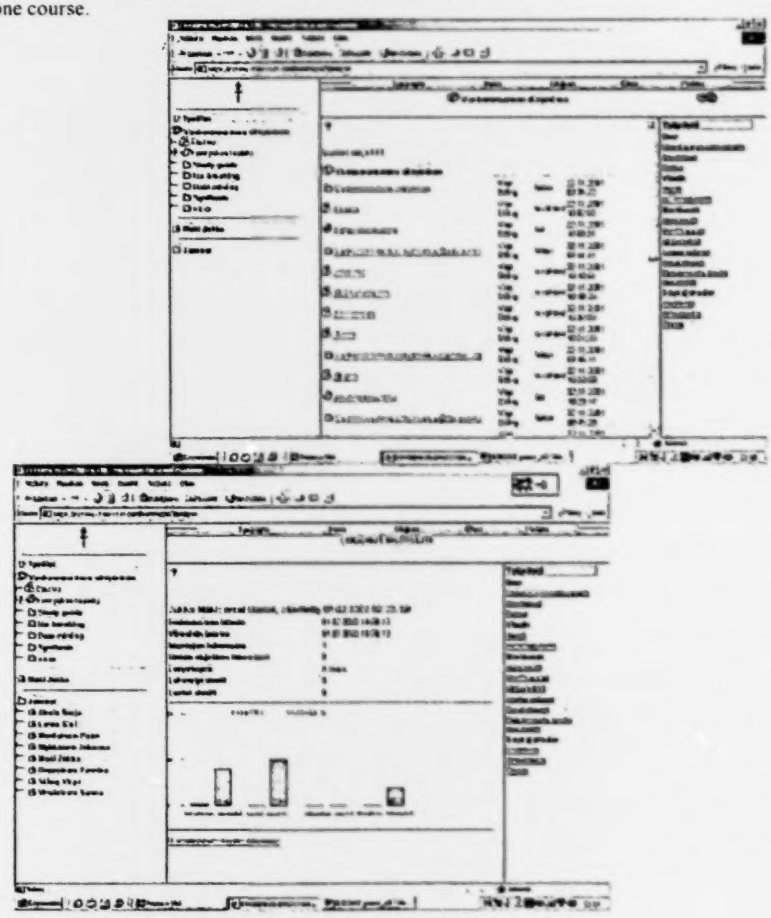
organizes, all the schools have ATM-network and videoconferencing facilities. The infrastructure supports students, teachers and pupils to enjoy the highways of information society.

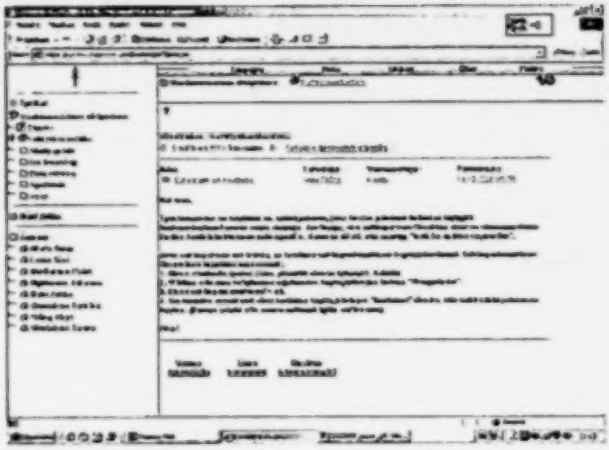
5. Learning environments

Chydenius Institute aims to be ahead of developing the education in teacher training in Finland. An essential part of the studies are web-based learning environments. Most common has been WebCT, but others, e.g. Blackboard and TopClass have been tested. Nowadays there are also many learning platforms created in Finland, e.g. Optima, LCProfiler, R5Vision, Humap, Efodi, FLE.

From 1997 there has been developed the platform Discendum Optima, earlier called Telsi. It has been found as a successful web-based learning environment. Because it is module-based, it gives freedom for administrative person to customize the environment the way that serves the purpose in the best way. A teacher can easily implement the pedagogical model of the learning that he has in his mind. It is pedagogically flexible environment offering diverse possibilities for team working and communication. The main tools of Optima are the usual ones: tools for administration, production and updating, documentation, calendar, teaching material, assignments, statistics, asynchronous conversation and online chatting. The power of Optima is that an administrator is able to customize the desktop very easily. Also it's very user-friendly and simple.

The Discendum Optima-environment is used all through the two-year-program. The Chydenius professors have made own implementations of Optima, according to every course. Here are some screen shots of one course.





6. Training of teacher training instructors in schools

One problem of teacher training is how to organize the instruction for teachers who take care of teacher trainees in their practical training in schools. The Chydenius two-year-program consists of four periods in elementary schools: the first one is four weeks in a local school in Kokkola, the second one is four weeks in a school that is selected as a training school, the third one is a two-week-period in mixed classes in country-size (preferably in home places of students) or abroad, the fourth one is a practice of special education (two weeks) and the fifth one is again in the training school having a period of five weeks.

The teachers, called training instructors, are given training to support students in their practical periods. Except of these instruction periods the Chydenius professors have organized an environment in Discendum Optima, where they can give instruction and information, but also to communicate with each other during these training periods at schools. In this way the training instructors have the possibility to change their ideas and share their problems.

This model for supportive instruction of teacher training is now in the moment created and implemented in Finnish teacher training. ICT and web-based learning environments give the possibility to develop the teacher training more diversified and flexible. The quality of instruction increases with ICT.

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www.chydenius.fi

An Examination of the Effectiveness of Types of Learner Interactivity in an Online Professional Development Course

Donna Morrow
Christchurch College of Education

Abstract
A professional development course, designed to examine the connection between learning theory and ICT (information and communication technologies) and taught by three methodologies was examined for learner interactivity. The course was delivered in three ways: a face-to-face class that used the online materials as a resource; an online class that received instruction and materials via the Internet; and a hybrid course comprised of a group of students at a remote location which met weekly for a phone-in conference with the instructor but received materials via the online environment. Four types of learner interactivity were examined: learner-learner, learner-instructor, learner-content and learner-interface. Conclusions drawn from this research indicate that students in the online, on-campus and hybrid classes considered e-mail or face-to-face contact with the lecturer as very important aspect of the class. Interaction with other learners online was rated highly but only if the situation in which this took place was organised and structured. Interaction with the course content varied among the different classes, but similarities among all students in the three classes were hands-on activities and lectures or explanatory content. The learner interface interactivity, although reported as somewhat problematic by all students, appeared not to be an issue, with most students solving problems with computers and Internet access either on their own or with the help from the instructor.

Introduction

Given the dramatic increase in online teaching and learning it is not surprising that online professional development courses for practicing teachers should show a corresponding increase in availability. These courses, offered both by tertiary institutions as well as commercial providers, provide a wide range of topics for the teacher in the classroom (Schrum, 2001), and range from self-paced tutorials with little or no interaction among participants to graduate-level courses with web-based discussion facilitated by discussion boards, chat rooms and e-mail (Branzburg & Kennedy, 2001). Within this new structure of professional development delivered online however, the need clearly exists to define the pedagogical issues, understand how the learners interact with this environment and discover the benefits and possible disadvantages of using this methodology.

Information Technology in the Teaching and Learning Process is a core course in a seven course Diploma of Information and Communication Technology at the Christchurch College of Education in Christchurch, New Zealand. The diploma attracts practicing teachers who want to upgrade qualifications and gain skills in using information and communication technologies. This course is designed to examine the connection between learning theory and technology used to enhance learning in the classroom, and is taught as a face-to-face course with provision for the occasional distance student made available through teleconferencing. At the beginning of 2001, an increased demand from students around the country wishing to enrol in the course as distance learners led to the decision to develop the course for online delivery. Due to the configuration of students requesting enrolment in the course, three different methodologies were identified: a traditional face-to-face class that would meet bi-weekly with the instructor on campus and use the online materials as a resource; an online class that would receive all instruction via the Internet; and a hybrid class involving a group of teachers in a remote location who would use the online resources in addition to an initial two-day, face-to-face start to the class and a weekly phone conference between the instructor and the assembled group. The existence of the three classes

presented a unique opportunity to explore how each of the groups interacted with the course materials, the instructor, other class members and with the technological interface used to deliver the course.

Methodology

To examine the learner interactivity, Moore's (2000) model of learner interaction was used. Moore describes this interaction in three forms. The first is learner-content, which is the process by which the learner intellectually experiences the content. Inherent in this type of interaction is the "internal didactic conversation" in which learners reflect on and "talk to themselves" about the content. Intrapersonal interaction, the processing of content within the learner's own head, is necessary if the learner is to construct meaning from the content (Berge, 1998). Moore's second type of learner interactivity is learner-tutor. When this interactivity is high then learners are able to draw on the experiences of the instructor and receive more individualised instruction and feedback. When this interactivity is low, more of the responsibility falls on the learner to interact with the content, remain motivated, diagnose learning difficulties and set an appropriate pace. The third type of learner interaction is learner-learner, which occurs "between one learner and another learner, alone or in group settings, with or without the real-time presence of an instructor" (p. 22). Learner-tutor and learner-learner categories of interactivity correspond to "interpersonal interaction" as described by Berge (1998) who sees this form of interaction as important because students need the opportunity to interact and communicate with other students and with the instructor. This type of interactivity builds a shared meaning and helps to make sense of what is being learned.

In addition to the three types of interactivity described by Moore, a fourth type of interactivity has been described as learner-interface which takes place when the learner must use the technologies to access the content and communicate with the instructor and other learner (Hillman, Willis, & Gunawardena, 1994). Seeing this as crucial to success of online learners, these authors state:

> "Successful interaction in the mediated educational transactions is highly dependent upon how comfortable the learner feels in working with the delivery medium. Learners need to possess the necessary skills to operate the mechanisms of the delivery system before they can successfully interact with the content, instructor or other learners. The challenge to practitioners of distance education is to create new instructional methods that empower learners to work successfully with the technology." (p. 32)

To discover the perceptions held by the students of the media, activities and interactions used within the course structure, students were asked to rate the contribution of each of the elements to their success in the class. The range of these media, activities and interactions included printed articles that were given or mailed to students prior to the beginning of the class, lectures given face-to-face or the same explanatory content online, PowerPoint slide shows presented face-to-face or online, links to websites, hands-on activities, video tape, discussions in class or discussions online, research article summaries by peers, e-mail contact with peers, e-mail contact with the lecturer, phone contact with the lecturer and face-to-face contact with the lecturer. Archival records of the online discussions and e-mail exchanged by the students and the lecturer were used to triangulate the end-of-course survey results.

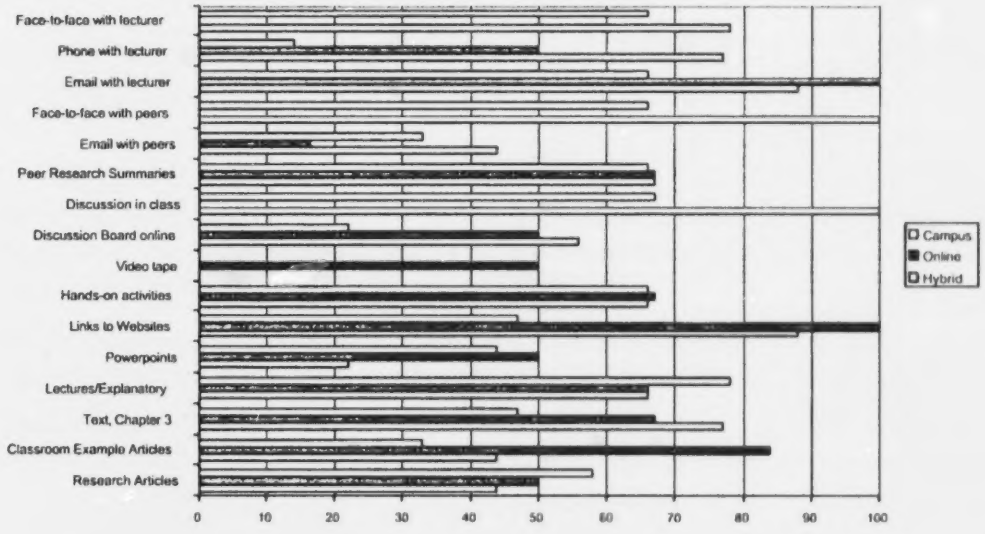
To understand the impact of the learner-interface interactivity, students were also asked to comment on how the technological interface affected their success in the course. Students were asked at the beginning of the course to rate their technological skills and comment on previous experience with the use of online materials or participation in an online course. The end of

course survey results were then compared with this initial data and both were compared with students' reported satisfaction with the course.

Results and Conclusions

The results of the end-of-course survey showed that some of the elements of the course were considered important by students in all three of the classes while other elements were specific to certain classes. Shown below are the results of the end-of-course survey showing the distribution of answers across the classes.

Table 1 Importance of Design Elements



Learner-content interactivity

Interaction with the course content varied among the different classes, but the majority of students in the three classes valued hands-on activities and lectures/explanatory content. Links to websites were considered important by the hybrid and online classes who accessed these more in the course of their study than did the on-campus group. The Powerpoint slide shows and the videos were marked as important by less than half the students, while the research articles and text were considered only slightly more important by students in the course.

Learner-instructor interactivity

Conclusions drawn from this research indicate that students in the online, on-campus and hybrid classes considered contact with the lecturer as very important aspect of the class. Only two groups had face-to-face contact with the lecturer and both considered it an important aspect of the class, while the online group, who interacted with the lecturer only online or by phone, did not consider this contact important to their success. All groups considered e-mail contact with the lecturer to be important. Phone contact with the lecturer was available to all and the online group and hybrid group considered this an important method of contact, while the on-campus group, who used it the least, considered it has having the least importance. The level of e-mail contact with the lecturer was high during the course. Table 2 shows the number of e-mails sent and received during the semester long course.

TABLE 2: E-MAILS SENT AND RECEIVED

Group	E-mails Received	Mean	E-mails Sent	Mean
Online	115	14	128	18
Hybrid	99	7	114	8
Campus	41	5	43	6

Learner-learner interactivity

Interaction with other learners online was rated highly but only if the situation in which this took place was structured and participation was expected. Statistics from the discussion board showed that postings by all groups were high when this was a requirement of a particular part of the course. The majority of the responses in the discussion board were to initial threads with no continuation of discussion. Second, third or fourth level postings, where students were responding to the postings of others, tended not to occur unless this was also a requirement. The hybrid group, which met each week specifically to participate in a phone conference with the instructor, valued the discussion in class highly, with 100% of participants marking this element of the class either 'important' or 'very important.' Sixty seven percent of the on-campus group also considered this element important. Research summaries written by peers and posted to the discussion board or presented face-to-face were considered equally important by all groups. E-mail between students was not considered important by over half the students.

Learner-interface interactivity

The learner interface interactivity, although reported as somewhat problematic by all students, appeared not to be an issue, with most students solving problems with computers and Internet access either on their own or with the help from the instructor. Over 75% of students reported their Internet access as reliable. Since the course attracts students who are already somewhat technologically literate, this result is not surprising. While students in all three classes felt that the Blackboard courseware made access to course materials easy, students in the online group were more positive in their assessment. Sixty seven percent of online students marked strongly agree to the question, "I found the structure and organisation of the Blackboard site made access to course materials easy." This result, probably an outcome of the frequency of access found in the online group, was reflected in the Blackboard statistics. The online class accessed the course most often with a total of 609 times and a mean of 76 times per online student. The hybrid class access the online site 438 times with a mean of 36.5 times per hybrid student. The on-campus class accessed the site 104 times with a mean of 20.6 times per on-campus student. Good learner-interface interactivity is also reflected in Table 1. E-mail with the lecturer, discussion board online and links to websites – all design aspects of the course that required technical skills – were reported as important to the participants success in the course.

Overall, all three groups were positive about the class. The differences were very subtle and would need further research to tease out the distinctions between the methodologies. A limitation of this research study was the size of the sample in each group and the conclusions would need to be validated with other research.

Examining the technology and media shows that for this study students were positive about the technology used to access and complete the course. The use of the Blackboard courseware was seen as an easy and approachable medium in which to work although students were at times frustrated by their lack of timely access. Most students were also positive about the range of media used to deliver the content of the course as well as the

forms of communication embedded within the structure of the course. Overall the students in the three groups showed that they valued hands-on activities, content delivered in a variety of formats and being able to have ready access to the lecturer.

Learner-content interactivity appeared to be robust and students reported that they felt that the course had increased their understanding of the connection between ICT and learning theory. Learner-interface interactivity, although all students reported technical problems, appeared not to be an issue, with most students solving problems with computers and Internet access either on their own or with help from the instructor. Learner-instructor interactivity appeared strong with all students reporting positively on responsiveness and effectiveness of the instructor-student relationship. Learner-learner interactivity appeared to be an area that could be strengthened. E-mail between students did not appear to be rated highly and use of the discussion board was limited for most students to posting their weekly assignments.

The online environment appears to be a viable methodology for the delivery of professional development to practicing teachers, although more research is needed to understand how this new medium can be utilised to reach maximum efficiency and effectiveness.

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A Formative and Summative Examination of a Goals 2000 Faculty Development Project*

Rosemary Mullick
SUNY Institute of Technology
United States
rosemary@sunyit.edu

Ronald Sarner
SUNY Institute of Technology
United States
ron@sunyit.edu

Abstract: The Goals 2000 project was designed to facilitate the achievement of the National Educational goals and the integration of instructional technology in the classroom. Eighteen teachers in grades 2-6 and five librarians, from nine different schools, participated. The project consisted of five modules on technological training. Both formative and summative evaluations were made to determine the effectiveness of the project. Formative information was obtained by administering Pre and Post evaluations for each of five modules and a post test for the sixth. Summative information was obtained by having participants respond to a General Pre-test to determine baseline measures for each of the general aspects of the project and a General Post-test upon completion. Results indicated that the project was successful in helping participants acquire knowledge and skills to facilitate the incorporation of technology into the classroom.

Introduction

The purpose of the Goals 2000 Grant is to promote the achievement of the National Educational Goals by providing state and school districts funds to support faculty development to achieve the Learning Standards developed in their state. The major aim of the Goals 2000 Faculty Development Project of the local school district was to provide opportunities for faculty to develop the knowledge necessary to fully integrate technology and to facilitate the use of library resources in instruction.

Method

A total of twenty-three people participated in the Goals 2000 Staff Development Project. Of the twenty-three, eighteen were teachers and five were librarians. All but one participant was female. The participants came from 9 different schools representing grades 2 through 6. The minimum number of years of teaching was 1 and the maximum was 30 with an mean number of years of 10.52. Approximately 56% of the teachers had five or more years of teaching experience. Therefore the teachers who participated in the project were relatively experienced teachers.

Each participant was involved with 14 separate modules throughout the duration of the project. Six of the modules dealt with technological issues and are the major focus of this investigation. The remaining 8 modules dealt with the development of thematic units and materials for achieving the New York State Learning Standards, learning techniques for integration of materials into courses and the development of interpersonal and consensus building skills.

The six technically oriented modules consisted of: PC Boot Camp to familiarize participants with the basic terminology, concepts and skills necessary to use PCs in instruction; Micro-Soft Word as a text-processing software to facilitate written communication; Micro-Soft Power Point for developing presentation materials; and Web Page Design and Web Page Graphics for making instructional materials available to students and for enabling teachers and students to create their own Web Pages. The final technologically oriented module was an extended training workshop for teachers, students and parents for using online library resources.

Formative Results

Formative information regarding five of the technically oriented modules was obtained using a pre-post research paradigm. Each post-questionnaire also provided the participants with an opportunity to make comments about the perceived strengths and weaknesses of the learning experience. The extended training workshop was assessed only by obtaining post session reactions.

Table 1 shows a summary of the paired sample t-tests performed on five of the technologically oriented modules. As can be seen from the table, all of the paired sample t-tests achieved statistical significance. These results indicate that participants believed that each of the technologically oriented modules was effective in teaching new concepts and skills to the participants.

Post test - Pretest	Mean Difference	t	df	Sig (2-tailed)
PC Boot Camp	11.33	11.89	20	.000**
Microsoft Word	8.30	14.36	20	.000**
Web Page Design	7.45	6.24	19	.000**
Web Page Graphics	26.70	8.21	22	.000**
Microsoft Power Point	5.13	6.88	20	.000**

**p < .01
*p < .05

Table 1: Summary of paired t-tests of changes for each technologically oriented modules.

Summative Results

To obtain summative information regarding the overall effectiveness of the entire project, a similar paradigm as the one reported in Bauder, Carr, Mullick, & Sarner (1997) and Mullick & Sarner (2001) was employed. All participants responded to a general pre-test that tapped their current level of expertise and experience with computing hardware, software and relevant peripherals. Upon completion of the project, all participants completed a general post-test to determine whether changes had occurred as a result of their participation in faculty development project.

Access to and Experience with Hardware

When asked the number of computers available in the classroom the largest number reported was 12. Only one teacher reported a classroom with the maximum reported number computers. Of the respondents, 17% said they had six or more computers in their classrooms, but all but one teacher indicated that they had at least one computer available in their classroom. In addition, 78% of the participants indicated that computers are connected to the Internet.

In general the participants had experience with some hardware. Virtually all reported experience with computers, CD-ROMs, and printers. Most had little experience with microphones, interactive video, video cameras, scanners or LCD panels. Participants reported that they felt comfortable with the hardware they had used in the past. These results are particularly interesting since participants indicated that all of the hardware listed is important in helping to achieve the New York State Learning Standards.

Access to and Experience with Software

Participants also reported experience with a limited number of types of software packages. Most had experience with word processing (Mean = 6.86 on a nine point scale). Some had experience with simulation programs, desktop publishing software, drill and practice, email, and web browsers. Virtually none of the teachers had experience with presentation graphics, hypermedia, student management applications or Web Development software. The participants did, however, feel that these software applications were important for achieving the State Learning Standards. The mean ratings of importance for achieving State Learning Standards ranged from 8.73 to 4.36 with Hypermedia being the only exception. The mean perceived importance for achieving the State Learning Standards for hypermedia/hypertext software was 3.50. Teachers therefore believe that integrating these types of software into the curriculum would facilitate the achievement of the State Learning Standards.

Results

Pre-Post Changes to Determine the Effectiveness of the Faculty Development Modules

A series t-tests for dependent (paired) samples were performed using the Total Frequency of Use of Hardware, Total Frequency of Use of Software, Total Comfort in Using Hardware and Total Comfort in Using Software as the dependent variables to determine if significant changes in participants' responses occurred as a result of their participation in the project. The findings from the analyses of the t-tests are displayed in Table 2.

Post test – Pre test	Mean differences	t	df	Sig. (2-tailed)
Total frequency of use of hardware	4.91	2.57	21	.018*
Total frequency of use of software	12.27	2.67	21	.015*
Total comfort of using hardware	8.86	2.73	21	.013*
Total comfort of using software	15.86	3.60	21	.002**

** $p < .01$

Table 2: Summary of the t-tests for dependent samples on changes in total frequency of use and total comfort in using hardware and software.

An examination of the last column in Table 2 shows that all of the analyses indicated significant changes from pre to post testing. Row 1 and 3 indicate that participants rated their frequency of use and comfort of use of hardware higher at the end of the project than they had previously with t = 2.57 and 2.67, respectively. Rows 2 and 4 show similar results for frequency and comfort of use of software with t = 5.33 and 7.32, respectively. These findings indicate that both frequency and comfort ratings for using both hardware and software, were higher at the completion of the project than at its onset.

Overall Evaluation of the Project

On the post-test, all participants rated each of the technologically oriented modules on three aspects: overall favorability, extent to which they believe that information encountered in each module will help to achieve the state learning standards, and the extent to which they expect to incorporate the knowledge into their future classes. A summary of the mean ratings for each is displayed in Table 3.

The mean overall ratings ranged from 5.35 to 7.70 on a 9- point scale with a score of 1 indicating low favorability. Therefore if a rating of 5 is the neutral point, all modules were rated in the favorable direction. The module that received the most favorable overall rating was Microsoft Power Point (Mean = 7.70). The module that received the least favorable rating was the PC Boot Camp (Mean = 5.35). In examining the average ratings of the extent to which participants' believed that each of the modules would help to achieve the State Learning Standards, once again, participants indicated that the module that would be most beneficial was Microsoft Power-Point (Mean = 7.61) and the module judged to be least beneficial was PC Boot Camp (Mean = 5.91). The final column summarizes the extent to which participants expect to apply information from each module in their future classes. The pattern of results is similar with Microsoft Power Point rated highest (Mean = 7.48) and PC Boot Camp rated lowest (Mean = 5.61). It may be that participants felt that they were sophisticated enough that they knew the material presented in the PC Boot Camp.

MODULE	Overall Rating	Achieve State Standards	Expect to apply in future classes
PC Boot Camp	5.35	5.91	5.61
Microsoft Word	7.30	7.43	7.30
Web Page Design	6.61	6.26	6.48
Web Page Graphics	7.17	6.65	6.87
Microsoft Power Point	7.70	7.61	7.48
Extended Day Computer Lab and Library	6.78	7.30	6.78

Table 3: Average overall rating, extent each module will help to achieve the state learning standards and extent to which participants expect to apply learning to future classes.

Analysis of Variance for repeated measures using participants' overall ratings, extent to which participants believed the modules would help achieve the state learning standards and the extent to which participants expected to apply knowledge from the six technologically oriented modules was performed. In all three analyses, the within-subjects variable failed to achieve statistical significance indicating that participants' overall ratings on all three measures were not significantly different from one another.

In summary, the three repeated measures analysis of variance show that participant perceived all of the modules highly favorably. Participants felt the knowledge they gained from each module would facilitate the achievement of the State Learning Standards. Finally, the results clearly indicate that participants intend to apply the knowledge they gained from the Goals 2000 Staff Development Project in their future classes. The highly favorable ratings also show that participants felt that the information they received in each module would be beneficial in integrating technology into the classroom.

Changes in Library usage

The Pre and Post-test questionnaires also examined the extent to which participants used library services available to them. The results of these analyses are displayed in Table 4. The last column of Table 4 shows that significant increases in library activities occurred as a result of participating in the project. Participants reported that they used local library resources significantly more, were significantly more likely to access the Mid York Library Web Page and to work collaboratively with librarians. Therefore, the project was successful in facilitating participants to increase their library activities.

Item	Mean	t	df	Sig (2-tailed)
Use local library resources	1.32	1.72	21	.050*
Use BOCES School Library Services (SLS)	.91	.036	21	.094
Use On-line databases	1.27	1.80	21	.520
Integrate library resources into your curriculum	1.18	1.82	21	.500
Access Regional On-line catalogs	.77	1.29	21	.105
Access BOCES School Library services Web Page	1.00	1.46	21	.080
Access Mid York Library Web Page	1.50	2.66	21	.007**
Work on collaborative projects with the librarian(s)	1.95	3.00	21	.007**
Total Index of Library Usage	9.91	2.42		.012*

***p <.01*
**p <.05*

Table 4: T-tests of changes in extent to which library activities were engaged in by participants

Overall Evaluation of the Entire Project

Three items of the general post-test attempted to assess the respondent's overall evaluation of the entire project. On the item that asked participants to indicate the overall evaluation of their experiences in the entire Goals 2000 Staff Development Project, the mran rating was 7.70 out of a possible 9.0. When asked if the participant would recommend this project to their colleagues, the average rating was 7.70. The final question to determine the overall evaluation asked participants to indicate the extent to which they agreed or disagreed with the statement "If given the opportunity, I would participate in a project like this again". The mean rating for this response was 6.74, indicating a high degree of agreement. Taken together, these results clearly indicate that the participants had very favorable experiences in the project and believe that the knowledge and information they gained will be helpful to them in integrating technology into the classroom. The results also indicate that participants would be willing to participate in similar projects in the future.

Open-ended Responses

Open-ended questions were included in all post-tests. Participants were asked to indicate the single most valuable feature of the module/project and the weakest feature of the module/project. A review of these statements indicate that participants liked the interaction with other participants, hands-on activities, learning strategies for integrating technology into the classroom and the ability to create materials that could be used in subsequent classes. The most common responses regarding the weakest feature tended to focus on lack time; lack of equipment; and the feeling that there was too much material covered in too short of a time period.

Conclusions

The results of the formative examination of each of the separate modules indicated that significant positive changes occurred as a result of participating in the technologically related modules. Participants indicated that they: learned the relevant material; felt they could incorporate the material into future instruction; and rated each module as highly favorable upon completion. The responses to the open-ended questions also provided information about how to improve the various learning modules if they are to be presented in the future.

The findings from both the Formative and Summative analyses indicated that participants' experiences were highly positive and that the participation in the project had a significant impact on their ratings. After each of the separate modules, results showed that participants intended to incorporate the knowledge they gained into their instruction. Upon completion of the project, results showed that participants were using technology more frequently in their classrooms than they had prior to the project. Secondly, participants suggested that the modules of the Faculty Development Project helped them to learn ways of integrating technology into their instruction and assisted in gaining confidence in using technology and in guiding their students in the use of technology. The results also indicated that although participants believed they were using library resources prior to the project, participation in the project allowed them to find new resources and new activities to be incorporated into future instruction.

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Graduate Instruction Combining Online, On-Site, and Face-to-Face: A Study

Priscilla Norton, EdD
Graduate School of Education
George Mason University
Fairfax, VA USA 22030
pnorton@gmu.edu

William Warrick, Instructor and Doctoral Candidate
Graduate School of Education
George Mason University
Fairfax, VA USA 22030
wwarrick@gmu.edu

Abstract: The efficacy of combining face-to-face and online instruction remains unclear in the literature. Nevertheless, for the mature learner, some combination of delivery models might offer a desirable learning option. Thus, in the Fall Semester, 2001, twenty students enrolled in a graduate level course focusing on learning and technology. Students were dispersed over a broad geographical area. A course was designed for these students that combined three patterns of instruction or learning structures: 1.) online discussion boards, 2.) face-to-face classes, and 3.) on-site small group, student run meetings. Students' ratings concerning their learning experience and the quality of their interactions with the instructor and peers in each of the three learning structures are presented and compared. In addition, students' rankings of the three learning structures related to learning and quality of interactions were collected at the end of the course and are presented.

Introduction

Much enthusiasm exists in the higher education community about the potentials of online delivery systems for coursework. Professional development programs and courses are being offered in a variety of ways, utilizing technology to differing degrees. Some simply use technology to improve the presentations, while others use technology to offer courses entirely online. The U.S. Department of Education's National Center for Educational Statistics (NCES), reported that the number of distance education programs increased by 72 percent from 1994-95 to 1997-98 (*Quality On the Line: Benchmarks for Success in Internet-Based Distance Education*, 2000). "However since the quality of these new programs can vary widely, education experts are telling teachers to shop around and ask questions first. Not all online programs offer teachers the right mix of collaboration and feedback (Weiner, 2001).

The efficacy of online versus face-to-face instruction or combining face-to-face and online instruction remains unclear in the literature. For instance, Hall, Watkins, & Ercal (2000) state that web-based instruction can be as effective as face-to-face instruction and that factors that lead to improved performance in face-to-face classes can also increase performance and positive attitude in web-based courses. Conversely, Thornam & Phillips (2001) suggest that those taking an online section perceive less interactivity than those taking a face-to-face section. Additionally, Johnson, et. al. (1999) found slightly more positive perceptions about the instructor and overall course quality in a face-to-face version of a course, although there was no difference between the two course (face-to-face and online) formats in learning outcomes. Cereijo, Young, and Wilheim (2001) examined students' comments while taking a CD/Web-based course. Their research revealed that students reported the advantages of CD/Web-based learning to be its convenience, flexibility, and opportunity for

enhanced learning. Conversely, students reported concerns about isolation, the learning environment, and technological problems to be significant disadvantages.

Despite concerns about web-based learning, for the mature learner hampered by geographical and time considerations, online learning remains a demanded and potentially viable learning option. It is likely that for many learners today some combination of delivery models offers a desirable and "doable" learning option. Thus, in the Fall Semester, 2001, twenty students requested an online course. These students were geographically distributed throughout northwestern Virginia. Because all students were practicing classroom teachers with full day responsibilities, it was not feasible for them to commute to campus for evening classes. Additionally, because of distance considerations, it was not feasible for faculty to commute to weekly classes in students' varied communities. We asked ourselves if it might be possible to use some combination of online and face-to-face patterns of delivery while continuing to maximize student interactions and learning. A course was designed that combined three learning structures or patterns of instruction: 1.) online discussion, 2.) face-to-face classes held off campus, and 3.) on-site, student-run, small group meetings. Given existing concerns about online learning and the experimental nature of this combination, we asked four questions: (1) How will students rate their learning experiences and the quality of their interactions in each of the three learning structures? (2) Will there be a difference between students' ratings concerning their learning experiences and the quality of their interactions depending on type of learning structure? (3) Which learning structure will students find most useful and least useful for their learning? and (4) Which learning structure will students report as affording the highest and lowest quality of interactions with their instructor and their peers?

Methodology

Twenty practicing educators enrolled in the course. All of these educators were candidates in a Master's of Education program emphasizing the integration of technology with classroom practice. All had previously complete 18 graduate credit hours. Four of the educators were elementary technology resource teachers. One was a middle school administrator; another was a district level technology coordinator. The remaining fourteen students were classroom teachers, spanning the K-12 curriculum.

The fifteen-week course focused student attention on learning and technology, placing attention on constructivist learning theory, the role of symbolic competence in learning, and the connection between theories of learning and the selection and use of a range of technologies to support teaching and learning. The course was conceptually divided into three four-week segments with a remaining three-week period for production of collaborative student projects. In each of the three four-week segments, students participated in each of the three learning structures selected to facilitate the course activities. Thus, students attended one face-to-face, instructor led class meeting during each four-week cycle. The face-to-face classes met in a middle school media center with internet-linked computers. During these sessions students shared the results of their on-site activities, discussed readings, and participated in instructor led activities. In addition, students posted weekly to a Blackboard discussion board. Discussions were prompted by the instructor as well as monitored and shaped by the instructor. Finally, during each four-week period, students met in small groups of three to five (organized around geographical proximity). These on-site groups engaged in activities assigned and described by the instructor using *Blackboard*'s class delivery system. Care was taken to insure that these activities were well designed, comprehensively described, and concluded with the production of a concrete product. In addition, guidance was provided concerning processes the groups might use to successfully complete the assignment. On-site small group activities engaged students in completely a product designed to encourage students to discuss, interpret, and apply insights and understandings from the readings. Products that resulted from the on-site group activities were either shared electronically or brought to face-to-face sessions to be shared. Email was used throughout the course to clarify, remind, and facilitate the work of the course.

At the culmination of each four-week period, students were emailed the link to an electronic survey. The researchers used the *Zoomerang* (http://www.zoomerang.com) survey service. Students were asked to respond to six questions. Students were asked to rate the usefulness (3 - Useful (U), 2 - Somewhat Useful (S), and 1 - Not Useful (N)) of each learning structure as a learning experience. Students were then asked to rate the quality of their interactions during the four-week period with the instructor, with their on-site peers, and with fellow discussion board participants. Students rated the quality of their interactions as positive (P), neutral (N), or unhelpful (U). Survey results were tabulated anonymously and summarized by *Zoomerang*. At the conclusion of the course, a final *Zoomerang* survey was emailed to students asking them to rank the three learning structures and their combination for their importance in students' overall learning experience. In

addition, students were asked to rank the three learning structures and their combination for the quality of their overall course interactions with the instructor and peers. Students were asked to assign 1 to the most important or highest quality through 4 as the least important or lowest quality. Using the *Zoomerang* survey software facilitated the collection of data. It also insured students' anonymity. However, because of the anonymity of responses, it was not possible to pair student responses across surveys, and thus, statistical analysis of data became problematic. As a result, data analysis was limited to descriptive and summative analysis strategies.

Results

The first question posed was: How will students rate their learning experiences and the quality of their interactions in each of the three learning structures? In order to answer this question, student responses to each of the three surveys were tallied and percents computed. Results of the analysis are presented in Table 1. Examination of the data suggests that more than half of the students viewed all three learning activities as useful. The data also suggest a slight decline for all three learning structures over time. The same basic patterns occur related to quality of interactions. That is, 60% or more of students rated the quality of their interactions to be positive regardless of learning structure as well as revealing a slight decline in ratings over time. Finally, in all instances, the online discussion board structure is rated slightly lower than the face-to-face whole group class and the on-site small group activity.

	First Four Weeks			Second Four Weeks			Third Four Weeks		
Learning Experience Using:									
	U	S	N	U	S	N	U	S	N
Online Discussion Board	58	37	5	68	16	16	55	25	20
On-Site Small Group Activity	72	22	6	79	16	5	65	15	20
Face-to-Face Whole Group Class	79	21	0	88	12	0	65	30	5
Quality of Interactions with:									
	P	N	U	P	N	U	P	N	U
Online Discussion Board	68	26	5	74	16	10	60	15	25
On-Site Small Group Members	79	21	0	89	5	5	80	5	15
Instructor	74	26	0	89	5	5	65	30	5

Table 1. Summary of Ratings of Learning Experience Using Three Different Learning Structures

The second question posed was: Will there be a difference between students' ratings concerning their learning experiences and the quality of their interactions depending on type of learning structure? In order to answer this question, means for student ratings were computed for each survey period and for the research period as a whole. Results of the analysis are presented in Table 2. Examination of the means for student ratings of their learning experience related to the three learning experiences further support the conclusion that students found the face-to-face whole group learning structure to be the most useful followed by the on-site small group structure with the online discussion board being the least useful. Students' rating of the quality of their interactions with the instructor cannot be compared with the on-sire and online structures since the instructor played a role during all three learning structures. It is possible, however, to note that students rated the quality of their interactions during on-site activities more positive than the quality of their interactions during online discussions.

	1st Four Weeks	2nd Four Weeks	3rd Four Weeks	Overall Means
Learning Experiences Using:				
Online Discussion Board	2.5	2.5	2.35	2.45
On-Site Small Group Activity	2.67	2.7	2.45	2.61
Face-to-Face Whole Group Class	2.79	2.9	2.6	2.76

Quality of Interactions with:	1st Four Weeks	2nd Four Weeks	3rd Four Weeks	Overall Means
Online Discussion Board Peers	2.6	2.6	2.3	2.5
On-Site Small Group Peers	2.9	2.8	2.7	2.8
Instructor	2.7	2.8	2.6	2.7

Table 2. Overall Mean Ratings for Learning Experience and Quality of Interactions

The third question of the study asked: Which learning structure will students find most useful and least useful for their learning? In order to answer this question, students were asked to rank the learning structures, using 1 for the most useful structure through 4 for the least useful structures. Percentages for rankings were computed and reported in Table 3. Examination of the data suggests that the majority of students (nearly half) ranked on-site group work as the most useful learning structure with face-to-face whole group receiving the next highest or useful ranking. Discussion board activities received the highest percent of "least useful" rankings, suggesting that this learning structure was not highly regarded as a valuable learning experience.

Learning Structure	Percent Ranking Most Useful (1)	(2)	(3)	Percent Ranking Least Useful (4)
Discussion Board	11.8	23.5	23.5	41.2
On-site group	47.1	17.6	11.8	23.5
Face to Face Whole Group	11.8	41.2	29.4	17.6
Combination of all three	29.4	23.5	35.3	11.8

Table 3. Overall Ranking of Learning Structures as a Learning Experience (Most Useful to Least Useful)

The fourth question of the study asked: Which learning structure will students report as affording the highest and lowest quality of interactions with their instructor and their peers? In order to answer this question, students were asked to rank the learning structures for the quality of interactions with peers and the instructor – 1 for highest quality through 4 for lowest quality. Results for the two questions are presented in Table 4. Examination of the data shows that the highest ranked learning structure related to quality of interactions with the instructor was the face-to-face whole group structure while the on-site group structure was ranked lowest. This is not surprising since the instructor's role in the on-site group structure was minimal while the instructor had a substantial role in the face-to-face whole group structure. Conversely, nearly half of the students ranked the quality of their interactions with peers highest in the on-site group structure. The face-to-face whole group learning structure was ranked second highest for quality of interactions with peers.

Quality of Interactions with Instructor	Percent Ranking Highest Quality (1)	(2)	(3)	Percent Ranking Lowest Quality (4)
Discussion Board	11.8	35.3	35.3	17.6
On-site group	5.9	17.6	17.6	58.8
Face to Face Whole Group	70.6	23.5	0.0	5.9
Combination of all three	17.6	35.3	35.3	11.8
Quality of Interactions with Peers	**Percent Ranking Highest Quality (1)**	**(2)**	**(3)**	**Percent Ranking Lowest Quality (4)**
Discussion Board	11.8	17.6	41.2	29.4
On-site group	47.1	23.5	11.8	17.6
Face to Face Whole Group	17.6	41.2	17.6	23.5
Combination of all three	29.4	17.6	35.3	17.6

Table 4. Overall Ranking of Learning Structures for Quality of Interactions with Instructor and Peers

Discussion

While all learning structures were rated as useful learning experiences and interactions were generally rated positively, the discussion board activities were consistently rated lowest. It seems clear that students found the face-to-face and on-site learning activities more important for their learning. Given that much of online learning centers around individual readings and research and group postings on discussion boards, these results are important. It is possible that the more common learning structure of postings to a discussion may not be the most effective manner in which to organize and conduct online learning. Perhaps Sonwalkar (2001) captures the limitations of discussion boards as extensions of the classroom discussion method of teaching when he writes: "In attempting to harness the capabilities of digital interfaces, the mistake is often made of recreating a classroom-teaching model within an online learning environment. Online technology designed to mimic the classroom becomes a restriction and a barrier to the teacher's ability to impart knowledge. (p. 2)."

Not only do the results suggest stepping away from conventional classroom-teaching models in online learning, the results of this study suggest a manner in which online learning might progress- small groups of students studying with the guidance of a virtual instructor. In all instances, students in this study rated their learning experiences and the quality of their interactions with peers to be highest when using the on-site learning structure. It might have been possible that on-site activities resulted merely in social gatherings or trivial commentary. Instead, students reported that these activities were the most useful for their learning. This not only reinforces the social constructivist perspective of learning – that understanding is achieved through dynamic, negotiated group construction of knowledge – but it also suggests that the most important role of the instructor in an online learning environment may be as designer. When the instruction in this course was carefully designed around a problem and a product – a performance of understanding, students were able to meet, interact with ideas, concepts specified in readings, and each other to build bridges between knowledge and understanding. Once students had solved a problem and constructed a product, they were able to share, elaborate, critique, and expand upon their understanding through both online and classroom presentation. It seems it is possible to have a virtual instructor – one who designs robust learning experiences and coaches and provokes from a distance. On the other hand, it seems that having virtual classmates – posting comments in response to instructor prompts or peer comments – does not facilitate learning in the same way as face-to-face peer encounters and collaboration.

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DEALING WITH DISRUPTIVE PUPILS: A Professional Development CDRom

Jim O'Brien, Faculty Of Education, The University Of Edinburgh, United Kingdom

Tony Van Der Kuyl, Faculty Of Education, The University Of Edinburgh, United Kingdom

David Thomson, Faculty Of Education, The University Of Edinburgh, United Kingdom

Abstract: The Scottish Executive funded the development of a CDRom to be used for teacher professional development. Following field research a range of stimulus materials in video, audio and text with associated activities were developed and piloted. Teachers are encouraged to review and develop their own skills and school policy and are provided with exemplars and additional references for consideration. The CDRom has now been published and is being disseminated throughout Scotland.

Introduction

The United Kingdom has several legally and politically devolved and autonomous education systems (Greaves & O'Brien 1996). The re-establishment of the Scottish Parliament in 1998 has resulted in even more distinctive Scottish education initiatives emerging despite similar problems and challenges across the UK. For over a decade, Scotland has promoted initiatives in school-based professional development and funded several ICT based support materials (van der Kuyl et al. 1994). The promotion of social competence and social inclusion through meeting pupils' needs in schools and classrooms and building on alternatives to school exclusion is a major UK policy.

Increasing concerns about disruptive behaviour by pupils in schools led the Scottish Executive to fund the "Dealing with Disruption" Project to research and produce a professional development CD-ROM (O'Brien et al., 2001). The identified range of potential audiences included classroom teachers, student teachers, senior management of schools, staff development coordinators in schools. The project (O'Brien and van der Kuyl, 2001) involved reviewing the literature and building on prior research (Lloyd and Munn, 1997; Munn, 1999). The literature search revealed publications with illustrations of work with individual children/young people with social and emotional behavioural difficulties. In addition to trawling recent advice and publications key individuals and organisations with direct knowledge of school and classroom practice were engaged. Existing materials and resources, including video, dealing with the management of disruptive behaviour were identified and reviewed. The most useful material is cited in the resource that also built on good practice and experiences from other initiatives which promote positive discipline and the development of social competence. Case studies based on such practices were prioritised and agreement reached with practitioners to video classroom practices. The CDRom is written in browser format to allow subsequent transfer to the WWW. At the moment, Scottish schools have insufficient bandwidth availability to allow useful video transference and for some time yet CDRoms will be a useful ICT medium for professional development purposes.

The "Dealing with Disruption" CDRom

The CDRom exemplifies for primary, secondary and special school teachers, effective methods for managing behaviour and dealing with classroom disruption and other forms of aggressive behaviour. The exemplars highlight a full range of scenarios but focus primarily on managing mild but persistent disruptive behaviour or low-level interruptions in everyday classroom situations. The CD-ROM includes a menu of situations including sequences of classroom incidents and good practice in managing the interruptions.

The resource developed has a core of exemplification materials in text, audio and video to provide advice and strategies relating to:

- whole school approaches
- positive ethos and reward systems
- departmental and individual responsibilities
- classroom approaches.

Drawing on good practice, the disk illustrates

- identified common principles in dealing with disruption
- comprehensive management strategies for dealing with disruption
- a range of teacher skills and behaviours derived from current knowledge about dealing with disruption and identified good practice

and provides suggestions about sources of support which will help individuals and schools deal with presenting issues.

Post in-school research, a concept development phase determined the scope and nature of the resource, chose appropriate issues and associated content and involved the design of the interface between the materials and the users. Production of the CD-ROM including all programming, engineering, de-bugging and beta-mastering was completed by 31 December 2000. Evaluation in 80 schools began in February 2001, this was designed to test the robustness of the curriculum and the product in the field and provide a final check of curriculum and technical standards before production and dissemination.

The evaluation led to significant changes in the interface and the improvement of a number of activities. One of the underlying principles was that the design allowed the user open access to all the assets and activities on the CDRom. While this remains, a number of portals into the assets have been constructed to allow users such as school managers or probationer teachers to initially familiarise themselves with the approach. Additionally a section for professional development coordinators (O'Brien and MacBeath, 1999) has been added. This has been an increasing focus of the dissemination phase of the Project.

The dissemination phase commenced in October 2001 and involved distribution of the completed CD-ROM to all Scottish schools in association with 25 national conferences. The Conferences involve an overview of the project and a 'hands on' introduction to the CDRom. Feedback and responses to date have been most positive. Each Conference includes a workshop where participants working in groups use assets on the CDRom plus the Professional Coordinator Portal to develop an additional professional development activity. On average 4 such activities are produced per Conference and these are being data-based and categorised with a view to developing a supporting and complimentary website. An important side effect of such conferences has been to encourage teachers to develop or customise CPD activities using ICT resources. The "Dealing with Disruption" CDRom may prove instrumental not only in enhancing teacher skills and knowledge about approaches to discipline issues but also in encouraging the wider use of ICT in learning and teaching beyond professional development.

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ACT Now!: Technology Innovation Challenge Grant Lessons Learned

Wendy Janine Parcel, Doctoral Student
Educational Technology
San Diego State University / University of San Diego
United States
wparcel@vcool.com

Rusty Meike, Manager, Educational Technology
Program Director: ACT Now!
Educational Technology Department
Sweetwater Union High School District
United States
rusty.meike@suhsd.k12.ca.us

Abstract: The Advanced Curriculum through Technology (*ACT Now!*) program began as a five-year old partnership between the Sweetwater Union High School District, institutions of higher education, public libraries, hardware manufacturers, software designers, telecommunications firms and local community organizations. With the aid of a federal Technology Innovation Challenge Grant (TICG), *ACT Now!* has initiated a campaign for systemic educational reform through the effective use of technological resources and learned many lessons along the way about what works, and what doesn't, when dealing with technology integration and professional development on a district-wide level.

Introduction

The position of the National Council for Accreditation of Teacher Education (NCATE) is clear: "Teacher quality–knowledge and effectiveness–is the number one school based factor in student achievement. ....Student achievement increases when students have teachers who are trained in developing higher order thinking skills, who are skilled at implementing hands-on experiences in the classroom, and who are trained to work with special populations" (2001). While much effort and money has been allocated to systematically prepare tomorrow's teachers to use technology well, few ongoing efforts to reach working teachers have been as thoughtfully planned. In 1996 the Sweetwater Union High School District applied for, and was awarded, a five-year Technology Innovation Challenge Grant called Advanced Curriculum through Technology Now! (*ACT Now!*). (#R303A60457) From inception, *ACT Now!* was different than most other infrastructure build-out and professional development grants in that the vision of reform was district wide. All teachers were afforded the opportunity to participate in the program and 72% did in fact do so.

ACT Now!

ACT Now! focused on integrating technology into the existing standards-based curriculum to increase teacher effectiveness through concentration on higher-level thinking skills and innovative use of Internet resources. (See movie at: http://www.suhsd.k12.ca.us/actnow/review/movie.htm). All teachers who participated agreed to voluntarily attend 40 hours of professional development training in return for the use of a high-end multimedia computer with Internet connectivity in their classroom. Particularly unique was the program structure. Wrapped around 16 hours of application specific classes were 24 hours of Advanced Curriculum through Technology (ACT) classes focused specifically on technology integration.

The program participants choose from two courses of study, the WebQuest Series and the Web Experience Series, and used online tools developed by *ACT Now!* to create and publish their own online lessons. All lessons created through the *ACT Now!* program are available through the *ACT Now!* Curriculum Library and are indexed by subject and grade. The ACT Online lessons are also indexed by special program and by SAT 9 content cluster. (http://www.suhsd.k12.ca.us/actnow/curricLIB/curric.htm).

The Teacher Training Quality Assurance Team (TTQAT), comprised of hand-picked district teachers with a combination of technological savvy and excellent teaching skills, provided professional development for *ACT Now!* participants. TTQAT members attended a summer train-the-trainer academy to polish skills and familiarize themselves with changes in the program and its curriculum.

The training philosophy was that:

- Teachers are most comfortable learning from other teachers.
- Learning about technology works best in small doses over a long period of time.
- Teacher created curriculum should align with district approved standards, engage students in collaboration and higher-level thinking, and use the web effectively.
- Training should be hands-on and project based.
- Trainers kept their hands off the mouse.

Lessons Learned

Now that federal funds are exhausted, the team has worked to ensure that core elements of the original program – and the original vision – are now woven into the District professional development platform. The need to reposition has allowed the team to reflect on their successes and failures, and its those lessons learned this presentation highlights. Briefly:

1. A viable infrastructure must be in place.
2. Buy-in among all key stakeholders is critical.
   - Teacher's Union
   - Site Leadership
   - Participants
3. Developers *and* facilitators must take care to neither overestimate or underestimate learners.
   - Self-reported surveys are self-reported surveys.
   - Some teachers are not "experts" in their fields.
   - The product must be scaled to match trainee competence, confidence and motivation level.
   - The team must provide multiple opportunities in scheduling and in credit options.
   - The team must plan for additional assistance (Tech Prep)
4. It's critical that training objectives align with other initiatives when possible.
   - Highly successful with Digital High School (DHS).
   - Missed opportunity with Specially Designed Academic Instruction in English (SDAIE).
5. Program staff must constantly think about documentation and dissemination; these are not merely "final-year" tasks.
   - Attendance tracking
   - Course registration
   - Tracking of equipment
   - Scheduling of instructors
   - Documenting of participant products
6. Performance (and motivation) improve when learners are required to produce an end-product and present it.
   - Motivates the learner
   - Share successes and validate the learners
   - Documentation is much easier
7. Staff must be prepared to update the curriculum and program on a yearly basis as technology and audience change.

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Establishing Graduate Cohorts for In-service Teachers in Rural Regions

Rudy Pauley, rpauley@marshall.edu
Assistant Professor, Elementary and Secondary Education
Marshall University Graduate College

Lisa A. Heaton, heaton@marshall.edu
Assistant Professor, Elementary and Secondary Education
Marshall University Graduate College

Abstract: The rural, in-service teacher is often confronted with many barriers when trying to obtain an advanced degree or additional certification. Geography, time, professional obligations and familial responsibilities are often barriers that hinder the continuing education of teachers today. Marshall University's Graduate School of Education and Professional Development has developed a cohort delivery model that takes degree programs to the teachers. This paper describes the model for delivery that has been developed over the past four years.

Introduction

Participating in Continuing Education courses can be a tremendous challenge for educators who live and work beyond the immediate service area of colleges and universities. Teachers living in isolated regions who want to work toward a Master's Degree, or to simply take courses for professional development, face a real challenge trying to work full time and travel to and from classes. Traditional university formats often fail to provide classes at suitable times for working adults, and in some cases, weekly evening courses are still beyond reach.

Multiple initiatives between the elementary and secondary education program at the Graduate School of Education and Professional Development and public school districts have been established to develop cohort programs in several regions of the state. Through these cooperative initiatives, web-based delivery is used to bring graduate education to working professionals.

Getting Started

The model for developing new cohort programs includes:

- opening lines of communication between elementary and secondary education faculty and school district personnel,
- developing a curriculum for the degree in cooperation with school district personnel,
- developing a working budget for the project,
- advertising within the school district or expanded region,
- conducting an information meeting with interested personnel and university faculty,
- activating student computer accounts, and
- meeting admission/registration requirements.

Program Structure

A program of study and course rotation is established that will allow cohort participants to complete a thirty-nine hour program within two years. Participants typically complete two classes each semester, with three courses being offered during one of the summer terms. Courses are offered in a mixed format, utilizing a combination of online and face-to-face interactions. Each course typically includes three to four face-to-face meetings, or one meeting per month. The remaining coursework and communication takes place via the Web.

The cooperatively designed programs of study can carry a variety of areas of emphasis within the elementary and secondary education program. Recent programs include: science education for elementary teachers, elementary

education with an emphasis in reading and computer applications, general elementary education programs, Spanish education for the middle grades, and middle childhood education.

The first course offered in each program is an introductory computer applications course that includes added emphasis on preparing students to use the online course delivery tool (WebCT). For students to be successful throughout the program it is imperative that they are able to function with the technology—navigating through course content and assignments, corresponding with instructors and classmates using mail and discussion features, submitting attachments, completing online quizzes and surveys, accessing online library resources, etc. Once students have mastered these tools they can focus on learning the designated content of their courses without getting bogged down in the technical setup of the course.

All face-to-face meetings are offered onsite within the designated school district. Class meetings are scheduled at the most convenient time possible, which may include a combination of evening meetings, a Friday/Saturday format, or summer weeklong workshops. The cooperating school district provides appropriate meeting facilities.

Students who may never come to the home campus are provided services in a variety of formats. Textbooks can be ordered by phone and delivered by mail. Library services can be accessed online and books and articles can be delivered through regular mail or in an electronic format. Advising is conducted through mail, over the phone, or on class meeting days.

Conclusions

During the past three years the elementary and secondary education program has worked cooperatively with school districts in establishing seven cohort programs within the state. Four of these programs have been completed with a 91% graduation rate (89 out of 98 participants), three programs are ongoing (86 participants), and two additional cohort agreements are being negotiated. The graduation rate and the level of interest in establishing new cohort groups around the state offer strong support for continuing this type of program.

Passive presentation programs and authoring language programs for classroom teachers - which is best for the K-12 teacher? Depends on your ultimate lesson and instruction strategy!

Marvin Peyton, Middle Tennessee State University, US
James Huffman, Middle Tennessee State University, US
Aubrey Moseley, Middle Tennessee State University, US

Over a decade of teaching passive presentation programs (PowerPoint) and authoring language programs starting with PILOT and SuperPILOT (Programmed Instruction Learning or Teaching) to the current – Hyper*.* programs, has convinced me that the specific use of each tool for instruction has become clear. Initially a teacher must define the lesson and then decide which program will meet needs for that lesson and then plan an instructional strategy. Instructional strategy will determine whether to use a passive style program such as PowerPoint or to use an authoring language program. Each program has instructional strengths.

For several years I have taught the Hyper*.* programs using the supposition that teachers were creating their own programs and presenting these programs 'lessons' to their classes. The basic authoring skills combined with teaching and learning theory are taught to undergraduates teacher in training and to the graduate students taking teacher education classes. The purpose of teaching passive presentation programs was to give these teachers some tools to create and present 'new' lessons for their classes. The purpose of teaching hyper style lesson construction was to provide the teacher with a means for creating interactive, not passive, lessons for their classes.

Teachers are using these two different programs to create very different instructional scenarios. The passive presentation programs are ubiquitous in most schools where technology is available. The instructional technique used for passive presentation programs is straightforward - mostly passive teacher led instruction with a mix of clip art, pictures, some sound and in some instances internet connectivity. Animation and movies when available are making these tools very popular. Instruction using hyper programs is not in the creation of total lessons and presentations of individual lessons but in the presenting the properties of the authoring language and then letting the student use their own creative ability to present information, lessons, projects, etc.

Preservice and inservice teachers have received training for years in the preparation of lessons using passive presentation programs. The current programs are extremely easy and convenient for new and experienced teachers to use for a multitude of lessons and lesson presentations. PowerPoint has become the presentation tool for teachers. The use of authoring programs is very popular for many teachers but not as a presentation tool but as a tool for the students to use in their classes. Teachers teach the basics of Hyper*.* programs and the students take the program and create their own lessons, presentations, etc.

Teachers who use hyper programs as software options for their classes are easily distinguishing passive presentation tools from active programming tools. Even those teachers who take the classes offering training in the use of both tools and then never teach using the specific hyper programs have indicated the value of learning new instructional approaches and methods for their traditional class lessons. In particular, the authoring program, HyperStudio, has served well the new and experienced teachers as they learn new instructional methods for their classes.

Project MITTS:
Developing Master Instructional Technology TeacherS

Susan M. Powers, Marylin T. Leinenbach, Susan J. Kiger
School of Education
Indiana State University, USA
Email: powers@indstate.edu

Abstract: In an effort to not only advanced the technology and curriculum integration skills of area teachers, but also to ensure that preservice teachers have technology-rich field experiences, a state grant was pursued and received to support a special project. The project is representative of new-generation of professional development that encompasses teaching performance standards, best practices for professional development, peer mentoring and preservice teaching mentoring, and utilizes the technology within training. The core of participant teachers have grown in their own integration of technology and are in turn exciting their students and the teacher education students about the uses of technology.

Project Background

As technology advances, it also advances on the educational community. This advancement can often feel like an army marching forward and over all those in its path. Indiana is not immune to impact of the ever-changing technology face on education and teachers. In fact, there are five, specific, yet closely related, needs in education in Indiana in which technology can or does play a significant role. These needs are not specific to Indiana alone, but are currently impacting many states.

One identified need is that the State of Indiana is moving toward a performance-based system for new teacher licensure and also for in-service teacher re-licensure. Many of the state adopted performance standards reflect the expectation that teachers effectively integrate technology into curriculum, and into instruction and assessment strategies; the desired outcome being individualization of instruction and increased academic achievement for the diversity of students and needs represented in any particular classroom. As part of this licensure/re-licensure system, a portfolio is projected to be the primary means of documentation of professional proficiencies along these standards (IPSB).

A second need is that while area schools and school corporations are increasing their technology focus through technology purchases and in-service training, most of the professional development has focused on technology competency rather than emphasizing the infusion of technology for enhanced student learning. Third, a new generation of professional development is needed that incorporates technology as part of the vehicle of the training (i.e. while the teacher is learning how to use the technology, technology is itself enhancing the professional development experience through such modalities as web-based instruction, video conferencing, and online tutorials) (McKenzie 1999; NCREL 2000). A new generation of professional development is differentiated according to participant needs; is contextual according to teaching and work assignments; integrates the technology for teaching and learning; and is grounded in the standards and professional development guidelines that affect teachers, staff, and administrators in Indiana (i.e. K-12 curriculum standards, IPSB teaching standards).

Going beyond a new type of professional development, a fourth need is that to promote substantive change and on-going growth, professional development for teachers needs to be readily accessible and needs to provide exemplars of practice. For example, Teacher X is more likely to learn from Teacher Y down the hall that is innovative in integrating technology into techniques for teaching, learning and assessment than from a university course or professional development seminar.

Finally, the National for Accreditation of Teacher Education (NCATE) 2000 standards (see http://www.ncate.org/standard/m_stds.html) requires that teacher education students participate in field experiences that substantively and effectively incorporate instructional applications of technology. Indiana State University, currently accredited by NCATE although not yet accredited under these new guidelines, strives to acculturate students in technology application-rich environments in on campus coursework, but recognizes the need for our students to be mentored in such application on-site in their field experiences.

The MITTS Project

In order to address these needs, a group of university faculty and area teachers banded together to seek a modest grant to support the necessary work. The group was successful in winning the Eisenhower Grant from the state and university support. The project was labeled Project MITTS – Developing Master Instructional Technology TeacherS. The project began in January of 2001 and continues for an 18-month period.

To address the statewide needs outlined above, MITTS has four goals. First, the project addresses state performance standards by not only directly addressing the educational need concerning effective infusion of technology, but also by providing specific evidence of professional development for participants. Teachers plan their own professional development throughout the grant period by participating in self-assessment and then the creation of a professional development plan of action. Second, the project also supports the incorporation of technology as a training vehicle, especially as it increases the accessibility of idea and information sharing. Much of the training is done through online workshops that have been located for the teachers, the project website, and support, announcements and discussion all evolve through electronic discussion forums instead of traditional workshops. Third, the target of this grant is multi-fold, by first developing the skills of participant teachers, who will foster technology integration with teacher education students, and then mentor colleagues in their buildings. Finally, the long-term focus and outcome of this project goes beyond the 15 participant teachers. The focus is also on the creation of technology application-rich sites and teachers to mentor preservice teachers.

Project's Successes and Concerns

The grant project has not yet reached its conclusion, but some elements are already apparent. First, the participants are noticeably more proficient with technology and display an increased confidence and comfort level in using and attempting different technology applications. This higher comfort level has translated into an increase in the number of ideas for technology integration as reflected in the professional growth plans of participants. Many of the growth plans initially submitted by teachers during Spring of 2001 were extremely conservative in their integration plans. Following a number of interactions with consultants, over half of the participants asked to modify their professional growth plans to make technology more inclusive and more integrated throughout their academic and classroom plan. This change is less a result of any interaction of grant participants, as much as the direct result of peer mentoring. The consultants that were brought in to work with teachers in small groups and one-on-one sessions are practicing classroom teacher who have been successful with technology integration and come from schools that have comparable technology levels. By observing peers who have found creative ways to meet learning goals with technology, and that it may have been done with little help, equipment, or experience, participants discovered a great capacity within themselves to use technology for teaching and learning. Participants have continued to seek out the expertise of these consultants as they continue to plan and create their own learning environments.

The project has not been without its problems. Originally, 27 teachers committed to the grant concept and participation. When the grant was awarded, 8 of these teachers elected to withdraw. The grant team quickly assembled 8 more teachers to replace them. Then, during the course of the semester, twelve more teachers dropped out for a variety of reasons. Although the limited participation from what was originally intended is disappointing, the remaining core of fifteen have been very dedicated to the work and enthusiastic participants. And although the seeming mass exodus of almost half the participants has been extremely unsatisfactory, the remaining teachers have been a joy to work with and the grant resources have been extended further for these participants.

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Using Online Sessions in Traditional Face-to-Face Graduate Education Classes: Lessons Learned and Suspicions Confirmed

Richard W. Schmertzing, Ed.D.
Education Center
Valdosta State University
GA, United States
rwschmer@valdosta.edu

Lorraine C. Schmertzing, Ed.D.
Education Center
Valdosta State University
GA, United States
lschmert@valdosta.edu

Abstract: As society becomes increasingly entrenched in its commitment to integrating technology into educational settings (Boyer, 1983) teachers are expected to model technology use for students, teach technology skills to students, and integrate technology seamlessly into students learning. However, teachers and administrators who have recently enrolled in graduate level education programs at a regional university in the south have been found to lack the ability to use technology for their own learning, lack the vocabulary to use proper terminology when referring to computer-related technologies, and lack the confidence necessary to construct technology integrated lesson plans. The proposed article will draw on qualitative data collected in four traditional face-to-face graduate education classes to promote the idea that periodic online class sessions help introduce educators to technology integrated learning in a way that is new to them and more importantly, valuable.

Introduction

As society becomes increasingly entrenched in its commitment to integrating technology into educational settings (Boyer, 1983; Achieve, 1999), teachers maintain their pivotal role in society by holding the position of those responsible for carrying out the tasks required to fulfill the commitment. Teachers are expected to model technology use for students, teach technology skills to students, and integrate technology seamlessly into instruction. As Murray (1999) points out, however, "As schools and districts jump on the technological bandwagon, committing significant portions of their budgets to the purchase of hardware, software, and Internet access, they too frequently neglect to provide for the professional development that will ensure the integration of the technology into the curriculum" (p. 33). Teachers often report that they have had few experiences that prepared them to adequately complete the varied phases of the task (Ravitz, Wong, & Becker, 1999; National Center for Education Statistics, 1998). Administrators, and educational leaders too, must be more aware of the new learning environments created by technology innovation so that they can better supervise instruction, as well as design and support professional development.

Across the country teacher training institutions are being required to integrate technology training into pre-service certification curriculum in order to more appropriately prepare new teachers to face the challenge (NCATE, 2001). There are, however, millions more teachers in the field who were trained prior to the infusion of a technology component into formal education and who are not equipped to model, teach, and integrate technology into learning environments. Even with staff development workshops, state mandates on technology skills for recertification (Ga. PSC, 2001), and numerous grant funded nation wide projects (U.S. Department of Education, 2001), experienced teachers and administrators who have recently enrolled in graduate level education programs at a regional university in the south have been found to lack the ability to use technology

for their own learning, lack the vocabulary to use proper terminology when referring to computer-related technologies, and lack the confidence and skills necessary to construct technology integrated lesson plans.

In this essay we draw on qualitative data collected in four traditional face-to-face graduate education classes to promote the idea that periodic online class sessions help introduce educators to technology integrated learning in a way that is new to them. Reduced seat time and increased time in an online learning environment can expand their professional development opportunities, challenge their desire to learn, help them identify learning styles, increase sensitivity to student needs, and allow them to experience technology integration in a manner that can translate to changed teaching practices. Although it is generally accepted in the academy that lifelong learning and continued professional development is important, using the Internet as a conduit for personal training and learning has not yet been incorporated into the education system in a way that inspires teachers to want to use it with their students.

The Study

The study on which this article was based was an action research descriptive case study (Yin, 1993) conducted in four graduate education courses at a regional university in the south. Two professors (also the two researchers) teaching face-to-face classes used online class meetings as a substitute for some of the traditional face-to-face classes. The four classes included; 1 technology course, 1 curriculum course, and 2 research courses. According to Stake, (1994) "Case study is not a methodological choice, but a choice of object to be studied" (p. 236). The object, or in this case subjects, who were studied in this research were students who were in a traditional face-to-face masters program and who had little to no exposure to online learning environments. The combination of the 4 classes makes a "unique case" (Yin, 1998, p. 238) that has multiple cases embedded within. Each graduate education course included in the study had characteristics that were specific to it, and therefore, each course was considered an embedded case (Yin, 1998) within the larger unique case. All embedded cases shared a similar physical setting, which was the traditional classroom. The embedded cases functioned as units of analysis in this action research based case study (Yin, 1998). However, the data reported in this essay was common to all embedded cases and is referenced henceforth as coming from the larger "unique case." Online discussions, course websites, email responses to research questions, and student comments made face-to-face were shared between researchers and used as data.

The Data

Several quotes form students are included in this section. The quotes are representative of the types of comments students made throughout the study.

> "I spent about 4.5 hours on this assignment. It was definitely a learning experience for me. As you know, I am not a very experienced computer (on-line) person, but this assignment taught me so much. I posted a web site that didn't have anything to do with statistics, but I thought it would be so useful to teachers so I wanted to share it with the class. I'm not sure I would want all my classes to be online, but I am glad I had the experience. The statistics are hard to understand, but I'm sure I'll get a better understanding after class tomorrow night."

> "The web class assignment was a new and challenging experience for me. I kept getting the same results over and over before I finally understood how to get to where I was supposed to be to post my information. I am still wondering how I could find the discussion board, and couldn't find the board to post my website. [...] I don't know if this is better for me, I think hearing you lecture gives it more meaning because you give examples with explanations and we actively participate."

> "This was my first attempt at an online class. [...] It's been very informative and I think I've learned a lot. The websites were the most interesting. I hope I've completed the assignments correctly."

Findings

With all the state requirements, technology mandates, and increase in the number of homes with access to the Internet, it was disturbing to realize the discomfort that our students, most of whom were teachers in P-12 classrooms, expressed with learning in web-based environments. Prior to any web assignments, each class met face-to-face for several weeks, which gave the students the opportunity to get to know each other, the instructor, and the type of expectations that were inherent in the course. A few times throughout the semester students were introduced in the face-to-face class to the website that had been designed to guide them through the next week's course requirements. Demonstrations were given to enable the students to use the discussion boards and students were given the opportunity to ask questions regarding the online course. Students had 7 days to complete the assignments on the web and could access the site anytime during those 7 days. The freedoms associated with asynchronous learning were explained to them. However, it was also emphasized that discussions depended upon participation in an ongoing manner and therefore they should check the discussion boards repeatedly throughout the week.

After each online session students communicated a sense of uncertainty or lack of confidence in their performance of the activities that were assigned as web activities. They routinely admitted the online experience was a new one that they benefited from but that they preferred face-to-face learning environments. Students commented on the value of learning from websites and occasionally transferred the concepts to their own teaching. Self reported time on task varied for students from one and a half hours to fifteen hours on the same assignments. It was evident that different types of tasks and different content made a difference in student attitudes about the online session.

When students were given the opportunity to find tutorials (some tutorials related to statistics others to learning technology skills), learn the material, evaluate the website, and share high quality resources with peers, reactions were quite positive. Students were able to choose tutorials that catered to their particular learning style, practice Internet searching skills, explore components that help make websites useful, and participate in collaborative learning. When students were asked to read, review, and discuss information they expressed a preference for having the professor tell them the information in class and some students considered lecture instruction to be more interactive than similar activities translated to the web.

Lessons Learned

Instructor's, whether teaching in higher education or P-12 classrooms, face new responsibilities in the age of the Internet. It has often been said that integrating technology into teacher education face-face classes allows the professor to model best practices that teachers can use in their own classrooms. However, rarely are professors encouraged to cut down seat time in face-to-face classes and model ways that online learning can be effective. By incorporating the online class as an instructional tool in our traditional classes, students were forced to improve their skills with the Internet, and in turn increased their level of confidence with it. Students were exposed first hand to the enormous range of resources available on the Internet and challenged to apply those resources to course specific tasks. Students, although it was not easy and they did not necessarily enjoy it at first, they developed a level of comfort with using web-based communication to participate in collaborative learning activities. This comfort moved the students to the necessary starting point for using web-based activities with their own classes - they succeeded at it themselves.

Suspicions Confirmed

Technologically mediated interactions between learners, instructors, and content in web-based environments are quite different than communicating in face-to-face environments. All of the traditional signals are removed from the communication process and students sensed awkwardness when they tried to decipher messages that were text only (Clevenger-Schmertzing, 2000). By transitioning students to online learning environments at the same time that they are taking face-to-face classes the students can begin to adjust to the different culture of the learning environment and still have access to the traditional culture as a safe space to discuss the new online experience. In this way the online class sessions not only provide new learning opportunities, but they also add to the learning that occurs in the traditional classroom. Framing discussions of

the online learning experiences as problem-based challenges sharpened students' critical thinking skills and helped them discover benefits to online learning. When we took the opportunity to familiarize our students with learning via computer interactions while at the same time offered the support of the familiar, traditional learning environment, our suspicion was confirmed that they had not considered the Internet a key to lifelong learning and professional development.

Conclusions

According to Mann & Shafer, (1997) "When school districts and teachers make a commitment to instructional technology, student performance improves. Or at least that's what everyone hopes" (p. 22). At this point in history there are still arguments about the connection between technology and achievement (Phipps & Merisotis, 1999; Russell, 1993). There may always be these arguments, but what is clear to us is that unless instructors, instructional designers, and researchers systematically investigate new technologically based learning environments in deep and meaningful ways, the arguments will not move toward resolution. Evidence, such as that presented in our study, not only moves those arguments along, it challenges us to find new connections between technology integration and learner performance. It is our belief that one area that deserves more attention is the use of the Internet as an opportunity for individualized learning within traditional, face-to-face classes. Modeling such activities in graduate teacher education programs may not only improve those programs but also may trickle down and have an impact on P-16 learning environments as well.

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Computer Camp for Teachers

Merryellen Towey Schulz, College of Saint Mary, US

ABSTRACT

Summer camp is not just for children. At College of Saint Mary we conduct a summer Computer Camp for Teachers. Student teachers are excited to enter the classroom and use the skills they have learned during their pre-service education -- including technology skills. They have learned to use technology and write lesson plans integrating technology with learning. Unfortunately, they often encounter cooperating teachers who make little use of technology in the classroom and have limited skills in the area. Many in-service teachers received their training prior to the integration of technology into teacher education programs and were left out of the loop for meaningful training. With Computer Camp for Teachers we are building a cadre of technology-using teachers to serve as cooperating teachers who support pre-service teachers in integrating technology in their student teaching experiences. It is a win-win situation for the college, the students and the practicing teachers.

Introduction

The purpose of this presentation is to inform educators and administrators of a model for teacher educators and in-service teachers to cooperatively learn and implement technology in the K-12 classroom. Just two years ago, much was written about the need to integrate technology training into teacher education. Like many institutions of teacher education, College of Saint Mary acquired additional equipment and software and taught pre-service teachers to use various forms of technology and write lesson plans integrating technology into student learning activities. However, it has been difficult or impossible to require student teachers to use their technology skills in student teaching experiences, because it was found that only a limited number of cooperating teachers used technology at the level the students had learned. To overcome this barrier, the college offered a Computer Camp for Teachers to train cooperating teachers to use the same technologies that student teachers were prepared to implement in their classrooms.

Three objectives of the PT3-funded Nebraska Catalyst Project were combined to create a cadre of K-12 teachers with expertise in educational technology who will serve as cooperating teachers and provide technology experiences for student teachers from College of Saint Mary. Objectives of the camp were: to design and conduct a graduate level summer workshop course to train a cadre of K-12 teachers in educational technology and assign student teachers to cadre teachers during the 2001-2002 school year. Ten K-12 teachers were identified and invited to participate in Computer Camp, for which each received three hours of graduate credit, Inspiration software, and a text.

The camp was conducted in a computer lab and education classroom at College of Saint Mary from 8:00 A.M. to 5:00 P.M. everyday for one week in June, 2001. Working lunches were used to discuss technology projects and demonstrate multimedia classroom equipment to participants. The structure of the camp was based on Jamie McKenzie's book, *How Teachers Learn Technology Best.* A teacher-friendly comfortable environment was created: lights in the lab were lowered to avoid the harsh environment created by fluorescent lighting, teacher friendly posters were displayed on the lab walls, music was played and plants were placed in the room. Two students served as lab assistants, providing participants with a 3.3 to 1 ratio for instruction and assistance.

Making the Classroom Computer Connection, by Tammy Worcester was the text for the course. Instruction in creating authentic projects to be used in their classrooms was given and teachers created web sites on which projects were submitted . Projects, including student goals for the course, were to meet ISTE standards for Teachers and Students and Nebraska Technology Competencies for Teachers.

Projects created were: graphic organizers with Inspiration® and Kidspiration® Software; digital camera photos; newsletters; WebQuests and Treasure Hunts, using Filamentality; Power Point Presentations; lesson plans integrating technology and strategies to manage classrooms with one or more computers. Assessment strategies were included in all projects

As a pioneer in the use of technology in elementary and middle school classrooms and as a professor of education courses, it has been natural for me to take this step to bring the process full-circle by including classroom teachers. Since becoming a college instructor, I have integrated the use of technology into all courses I have taught and trained other faculty to do the same.

The presentation will consist of Power Point slides and the camp web site, http://drmts.com/camp/index.htm followed by a question and answer session if there is time. This easily replicable

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project is significant and relevant to teacher education in that its purpose is to assure student teachers of placement with cooperating teachers who possess skills and motivation to integrate technology into K-12 classrooms. A symbiotic re lationship develops between the teachers and the pre-service teachers as they work together to implement technology projects they have been taught to use. During the 2001-2002 school year teachers will be surveyed to determine their use of technology in the classroom.

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Using a Resource-Based Learning Environment to Foster Self-Directed Learning in In-Service Teachers

Mary Shoffner, Georgia State University, US

Presentation Plans:

Self-direction is a necessary characteristic in lifelong learners. Teachers, in order to make best use of the new tools and changes in approaches to teaching, must be life-long learners. As technology is ever changing, simply providing the in-service teacher with basic technology skills will not be enough. They must be able to self-direct and self-regulate their learning for the duration of their careers if they are to effectively practice their profession. A resource-based, WWW-based learning environment was developed for a course in teaching methods, lesson planning, technology skills, and technology integration strategies for students in a graduate teacher education program. This presentation will briefly present the philosophy behind the course design and development, including self-directed learning and resource-based learning environments. A brief review of prior research examining self-directed learner readiness and pre-service education will be given. Pre- and post-test versions of a technology skills inventory that matched the NETS-T profile and the Self-Directed Learning Readiness Scale (Guglielmino, 1977) were administered to as part of the course. Data is currently being collected during the Fall 2001 semester.

This exploratory study examines an alternative approach to technology education for in-service educators. In-service educators were introduced to a resource rich environment, and then given opportunities to use, and thus learn from, this environment. By interacting with this environment, it is hoped that in-service educators will learn not only technology and integration skills, but will at the same time develop or increase self-directed learning skills which in turn might prepare them for successful life-long learning.

Methods

A resource-based learning environment was developed in Fall, 1997 to serve as the basis of a course for in-service educators as elective service course in instructional technology for the College of Education graduate students. Pre- and post-test versions of a technology skills inventory and the Self-Directed Learning Readiness Scale (form A) (Guglielmino, 1977) were administered to as part of the course.

The technology skills inventory is a locally developed self-report instrument containing thirteen demographic items and 25 technology skill items based on the NETS-T performance profile for First-Year Teachers. Technology skill items include open-ended, multiple choice responses, as well as Likert-type indicators of skill level descriptions, and address skills and attitudes toward technology use.

The Self-Directed Learning Readiness Scale (form A) is a 58-item questionnaire with Likert type responses design to indicate a person's readiness to engage in self-directed learning activities. The SDLRS is the most widely used instrument of this type and was therefore chosen for the study.

The basic factors said to underlie the construct of the SDLRS are as follows:

1. An openness to learning opportunities.
2. Self-concept as an effective learner.
3. Initiative and independence in learning: tolerance of risk, ambiguity, and complexity in learning.
4. Acceptance of responsibility for one's own learning.
5. The love of learning.
6. Creativity; risk taking, skill in designing atypical solutions, and ability to conceive of multiple approaches to topics.
7. Future orientation; self-perception as a lifelong learner.
8. Problem-solving skills; skills for study and problem solving (Long, 1991).

All of the above skills are necessary for teacher success in the technology infused classroom.

In addition, students were asked reflect on the following questions a the beginning, middle, and end of the course:

1. What do you hope/expect to learn while you are in this course? /Have your expectations for what you hoped to learn in the course changed since you wrote your last Reflection Paper?
2. How much do you feel you have learned/grown in this course to date?
3. Do you feel you have gained a better understanding of how to tackle challenges?
4. What are you doing differently with technology than before you took the course?

Final reflection questions include:

1. How prepared do you feel to enter the classroom and use technology in a lesson?
2. What might help you to put what you've learned in this class to use in the classroom?
3. What impact will the level of technology resources in your school or future school of employment have on your teaching?
4. In your opinion, can technology help teaching and learning?
5. How do you plan to keep up with changes in technology as your move through your teaching career?

Responses in the reflection papers will be examined to gain further, richer insight into how students are using the learning environment to address teaching and technology concerns.

Students completed the skills inventory and SDLRS as part of the course. Students were given an explanation of the study, and students indicated their willingness for their data to be included in this exploratory study by affixing their signature to an "informed consent" form. To date, data has been collected from 40 students in the Fall 1998 semester and 40 students in the Spring 1999 semester.

Evolving Uses of Technology in Case-Based Teacher Education

Janet C. Smith
National Center on Adult Literacy
University of Pennsylvania/Graduate School of Education
United States
smith@literacy.upenn.edu

Ricardo Diaz
National Center on Adult Literacy
University of Pennsylvania/Graduate School of Education
United States
diazr@literacy.upenn.edu

Abstract: This presentation discusses the evolution of technology-facilitated, case study-based professional development for adult education professionals by examining three projects involving the National Center on Adult Literacy (NCAL) and the International Literacy Institute (ILI) at the University of Pennsylvania/Graduate School of Education. The projects in order of development are the *International Literacy Explorer: A Teacher Training Tool for Basic Education, Captured Wisdom: Stories of Integrating Technology Into Adult Literacy Instruction,* and the *Professional Development Kit (PDK): Multimedia Resources for Instructional Decision Making.* These projects are in various stages of completion and represent an evolving variety of solutions to the challenges of effective, technology-facilitated teacher education. We briefly discuss some of the conceptual background for using the case study method for teacher education and some of the limitations of using written case studies. We then discuss how technology can facilitate the use of case studies in professional development. Finally, we look specifically at the three projects, which were developed over a period of several years, how each responded to the issues raised in earlier projects, and how they provide crucial background information for a new initiative, *TECH.21: A National Technology Laboratory for the Improvement of Adult Education.*

Introduction

In 1986, the Carnegie Task Force on Teaching as a Profession published their report entitled "A Nation Prepared: Teachers in the 21st Century," which recommended using case studies as a major focus of teacher instruction (Carnegie, 1986). Lee Shulman advocated the use of case studies for teacher education, feeling that they were a good means of connecting theory with practice and of showing that teaching itself was a complex activity that demanded high level decision-making skills (Shulman, 1992, p. 28).

Case studies can be teaching and/or learning tools and the key element is that they are situated in real world contexts. Merseth (1994) saw cases as serving as exemplars, opportunities to practice analysis, and stimulants to personal reflection. Case studies were understood, as they had long been in law and medicine, as ways to hone analysis and decision-making skills with authentic situations. More recently, when Putnam and Borko (2000, p.8) discussed the renewed interest in situated cognition, they pointed out that cases provide vicarious encounters with real classroom environments because they are *situated* by their very nature. Some of the benefits they mention include opportunities for reflection and critical analysis that are not possible when acting in a real classroom setting, exploration of the richness and complexity of authentic pedagogical problems, and shared experiences for groups of teachers to explore together.

The limitations of text-based case studies for teacher education can be summed up by saying that they fail to capture and communicate the reality of the nuances and immediacy of actual classroom settings, just as they fail to capture the drama of a courtroom for aspiring law school students. The tone of voice, facial expressions, and gestures of the teacher as well as the learners give color to the starkness of black and white text detailing case studies. Video provides all of this and more to preservice and in-service teachers.

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The Use of Video in Case Studies for Teacher Education

The introduction of video into case-based teacher education was a great step towards more accurately portraying the complex, real life situations that characterize the reality of teaching. Video is able to capture the complexities and realities of the classroom (including facial expressions and gestures) while providing the time for analysis and reflection that is impossible when actually sitting in a classroom observing. Analysis and reflection are essential for transforming a simple videotaped lesson into a true learning experience for preservice and in-service teachers. Not only can the video be stopped to allow for guided discussion and reflection at various points, but it can also be reviewed several times in order to search for nuances in the teacher's decision process and to examine the action from various different perspectives (learner, teacher, administrator). Unfortunately, linear video without discussion and guidance to help teachers actually change their practice over time is not very effective (Lauro, 1995, p. 65). CD-ROMs, DVDs, videodiscs, and multimedia Internet websites can all help overcome the limitations of linear video viewing and increase teachers' interaction with the case. In this way, teaching is seen more realistically – as a multifaceted problem-solving process.

Each of the media mentioned above has its own characteristic benefits. Linear videotape is important for conveying a sense of the overall lesson and the flow of the classroom. Videodisc technology has the benefit of allowing teachers to quickly focus on specific, shorter segments of the whole and therefore interact more immediately with the material (Atkins, 1998). The Internet and its innumerable websites add (a) the dimension of anytime/anywhere learning; (b) the capacity to utilize listservs, chats, bulletins boards, and so forth for communication; and (c) access to the most current materials through relatively easy and inexpensive updating. The following section will discuss how the various media were utilized in the three technology-facilitated NCAL/ILI professional development projects for adult education teachers.

The Evolution of Three Multimedia Professional Development Projects

Quality professional development that actually changes current practice (and its outcomes – adult learning) is one of the keys to effective adult instruction just as it is to effective K-12 instruction. The National Center on Adult Literacy and the International Literacy Institute at the University of Pennsylvania have been working on solutions to this challenge for well over a decade. The following three projects were designed and implemented by many of the same team members and therefore benefited greatly from the experiences and lessons learned in all of other projects.

International Literacy Explorer: A Teacher Training Tool for Basic Education

The *International Literacy Explorer* (ILE) is a multimedia teacher training tool for basic education designed to give an overview of literacy and basic education issues and practices in an international context. The *Explorer* offers ideas, discussions, and activities to teachers/practitioners, policymakers, and researchers in order to enrich literacy thinking. In the context of the worldwide effort to more fully and effectively increase the literacy skills of all people, the *Explorer* focuses on several innovative, useful, and/or effective literacy projects and programs across the globe. Also included are supplementary sections on general literacy concepts and statistics to help the user to better understand the consequences of widespread illiteracy, the need for and importance of literacy education, and the achievements of the specific literacy projects. The *Explorer* has four main sections: "Literacy Overview," "Literacy Projects" (case studies), "Statistics," and "Resources." The product is available free in its most up-to-date state on the Internet (www.literacy.org/explorer/index.html) and also in the original CD-ROM version.

The "Literacy Projects" section contains 12 case studies grouped under the following headings: Language and Culture, Gender and Development, Teaching and Learning, Quality and Innovation, and Technology for Learning. Each individual case study contains the following elements: (a) Background (the issue in brief and in

that country's context), (b) Overview of the Project, (c) Activities (teacher/practitioner focused), (d) Outcomes and Implications (researcher and policymaker focused), (e) Resources, and (f) Questions. The case studies are quite text heavy and represent an almost *textbook* model of case study methodology. Short segments (10 to 20 seconds) of video are in the Activities sections and there is the potential for some interactivity on the Questions pages, where users can email the creators of the site with inquiries.

The benefits of using technology for this project were multiple and at several levels. Although it was originally planned solely as a CD-ROM (so as to be available in locations where Internet access was minimal), the developers, who were located in several different countries, found it most efficient to design on the web for ease and rapidity of communication. The website was then simply transferred to CD-ROM and involved only the challenge of making the database functional. While it was useful to have the information on the web in terms of a wider audience, the time length of the videos was severely restricted by connection speed over what might have been possible on CD-ROM. The benefit of that decision, however, was that the videos were very targeted and to the point, so viewers actually watched them in their entirety as opposed to what often happens when users move on without completing the videos or just read the transcripts. Because of the hyperlinking potential of the web, multiple perspectives could be delineated for those users with limited time to browse. Thus teachers/practitioners could jump directly to the Activities sections of all 12 case studies and researchers/policymakers could likewise jump directly to the Outcomes and Implications sections without destroying the integrity and flow of the site as a whole. The "Help" (FAQs) section of the website not only walks the user through the organization and navigation, but provides specific suggestions to the various user groups on how to use the site as a professional development tool.

Our retrospective view of the website is that it (a) is probably too text heavy for a website, (b) would benefit from an effective mechanism for information sharing (such as a database interface for new case studies, resources, etc. and a discussion board), and (c) needs an efficient means of updating. The Questions page could have been expanded with some discussion and reflection questions to enrich the user's learning experience. We do see the site as most effective as a stimulus for group discussion and reflection during guided professional development activities. We know that it has been used that way as well as a resource for college classes and for individuals in various countries throughout the world.

Captured Wisdom on Adult Literacy: Integrating Technology Into Adult Literacy Instruction

Captured Wisdom (www.literacy.org/capturedwisdom.html) is an interactive resource that is designed to help inform educators of successful practices of integrating technology into adult education instruction. Innovative, replicable activities are shown, described, and discussed by front-line classroom educators and learners so that other teachers feel that they have had an opportunity to actually visit and chat directly with the learners and teacher about their work together. The two CD-ROM set contains 7 different 20 minute videos of authentic adult education classrooms. To develop each of the *Captured Wisdom* stories, teachers and learners were filmed describing and demonstrating how they use technology in classroom-based projects. Each edited, videotaped segment was then viewed by focus groups of adult educators. These educators wrote down questions that they wanted to ask the teacher. The focus group teachers felt the answers to these questions would prepare them to use activities in their own classrooms. The questions were divided into the following categories: Learners, Instructional Activities, Project Management, Technology Issues, and Products and Assessments and directed to the presenting teacher. Responses were tape-recorded and included as companion segments on the CD-ROM. This development process assured that the implementation needs and concerns of real teachers in real adult education programs were addressed. Also included with the set is a short instruction booklet that explains how to use the *Captured Wisdom* CD-ROMs effectively in professional development. The video vignettes (case studies) are also available on two videocassettes with an accompanying booklet for professional developers with suggested activities on how to use the vignettes in group professional development on topics as varied as alternative assessment, multidisciplinary teaching, and project-based learning. The model for *Captured Wisdom* was developed by the North Central Regional Education Laboratory (NCREL) for K-12 teachers and was extended to address the needs of adult literacy instruction by NCAL.

The *Captured Wisdom* CD-ROMs enrich the experience of linear video for adult education professional development with the questions and answers (in text and audio) posed by real life teachers about the

implementation of the technology integration in their classrooms. Although there is no specific mechanism for information sharing and easy updating with *Captured Wisdom*, the focus group questions and answers provide additional insightful comments about the classroom experience viewed on the video. These can lead to further discussion and reflection on the part of individual teachers or groups of teachers. The print booklets that accompany both CD-ROM sets and videocasette sets contain suggestions and activities that can be used directly by professional developers or groups of interested teachers seeking to improve their practice.

The portability of the self-contained CD-ROMs is a distinct advantage over web-based, video-enhanced professional development that necessitates a fast Internet connection. The CD-ROM medium can contain substantial video segments and is extremely inexpensive to produce. However, without a projection system, the CD-ROM provides a relatively private experience of the product on a single computer screen. There has been discussion of adapting this product for the web, but the length of the videos is problematic. Considerable adaptation would have to take place to customize the videos for typically impatient web "consumption." The videocassettes of the vignettes are more easily shown on large size TV screens to groups, whether they are preservice/in-service teachers, administrators, or board members.

There has been considerable feedback on this product, which has been available for about a year. Professional developers have used it with much enthusiasm as have literacy program directors who have shown it to their funding boards as a vision building exercise for how technology can motivate learners and contribute to their learning.

Professional Development Kit (PDK): Multimedia Resources for Adult Educators

The *Professional Development Kit* (PDK; www.literacy.org/pdk.html) is a multimedia resource for adult educators that utilizes print, video, CD-ROM, and the depth, flexibility, and complexity of the web. It consists of a reflective framework that supports participants' efforts to generate questions and brainstorm solutions to challenging professional situations. PDK aims to support community-building and collaboration among adult educators by providing opportunities and tools for communication. PDK consists of a variety of resources, including

- 10 hours of video investigations containing interviews with learners, teachers, researchers, and administrators; examples of classroom practice; and in-depth exploration of specific topic areas such as ESL, ABE, GED, math, writing, assessment, integrating technology, and much more;
- a website that contains online tools such as discussion boards; teacher portfolios with self-assessment activities, data collection suggestions, action plan infrastructures, and reporting frameworks; and
- five knowledge databases to search related resources, and a participant's guide that describes the system and identifies possible applications in various contexts.

The three main sections of PDK are the "PDK Community," "Investigating Practice," and the "Knowledge Databases." The "Investigating Practice" section contains 5 video case studies called Classroom Investigations. Each of these includes (a) a 15 to 20 minute narrative with teacher reflection and student reaction, (b) a highlights video section of 5 minutes about the specific lesson, and (c) topic area videos of about 2 to 3 minutes that address techniques or skills that the teachers use to deal with the issues of learner anxiety, motivation, diversity, and disabilities, just to name a few. The taping and editing of the 10 hours of video took place over a 3-year period of time. The role of the video was not to create a model of perfect teaching, but rather to capture what was happening in an actual classroom as well as teacher' and students' reflections about those interactions.

Although PDK videos are available on conventional videotapes for viewing in group or classroom settings, the full power of the program can only be experienced through the interaction of all the components on the web and on CD-ROM. The CD-ROM contains the Quicktime™ video that is accessed from within the computer's CD-ROM drive as one navigates through the different organizational elements of the PDK website. In this way, the user is not hampered by Internet connection speed for the delivery of significant amounts of video. This carefully
edited video is surrounded with the resource and communication structures of a comprehensive website.

The "PDK Community" is composed of a My Portfolio section (self-assessment activities, data collection, action plans, reporting frameworks with all information saved to an individual's personal online portfolio) and Discussion Boards (for national as well as small group listservs with tools for creation and management). The My Portfolio areas contain information and learning activities that help users articulate questions about their practice, brainstorm creative solutions, implement plans, and write up the results of this process. Not only can users keep track of their own development, but they can participate in larger learning communities via the discussion boards. This leverages technology's capacity to connect people and ideas in information-sharing activities.

The online, searchable "Knowledge Databases" is divided into 5 parts that complement the PDK learning activities. The 5 parts are (a) PDK practitioner reports (contributed by participants in the program), (b) PDK TIPs (short papers providing information on integrating research and theory into teaching contexts), (c) online articles complementing the video case studies, (d) professional development resources (annotated list of online resources with links to conference information and other learning opportunities), and (e) lesson plans. This database will continue to grow with contributions from users of the PDK system and it leverages technology's capacity to store and then locate large amounts of information.

Although this project is not yet complete, prototypes have been tested and used in professional development groups with positive feedback. The community section currently hosts many small groups of practitioners from various areas of adult education and the databases contain materials selected for their appropriateness to the issues presented. The product will be most effective in facilitated group professional development with the extra benefit that the group can be virtually present (via the Internet) if not physically present in one room.

Brief Analysis of the Projects

The ILE began with the goal of providing a readily accessible teacher education tool for adult basic education by utilizing video case studies and information and communication technologies for delivery. The limitations of web-based video delivery resulted in very short videos and a quasi-textbook model. The *Captured Wisdom* CD-ROMs and videotapes *captured* classroom practice and complexity more realistically and allowed for more substantial video and actual teacher questions and answers. However, the presentation on CD-ROM was relatively static and unable to respond to user's questions and personal professional development. PDK, which encompasses print, extensive video on CD-ROM, and a comprehensive web-based structure, truly uses the available technology in a seamless, unobtrusive fashion. All the technology tools work together to support the growth of teachers.

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A Comprehensive Formative Evaluation of an Online Master's Program

Laura E. Sujo de Montes, Ph.D.
Center for Excellence in Education
Northern Arizona University
United States
Laura.Sujodemontes@nau.edu

Elizabeth M. Willis, Ph.D.
Center for Excellence in Education
Northern Arizona University
United States
Becky.Willis@nau.edu

Michael J. Blocher, Ph.D.
Center for Excellence in Education
Northern Arizona University
United States
Blocher@nau.edu

Gary Tucker, Ph.D.
Center for Excellence in Education
Northern Arizona University
United States
Gary.Tucker@nau.edu

Abstract: This paper discusses the importance of conducting formative evaluations. The Master's of Education in Educational Technology at Northern Arizona University is a young online program in its second year of implementation. Because online degree programs are new to the educational arena, little is known about the best pedagogy, workload for both faculty and students, and effectiveness of the program. This formative evaluation will collect information from stakeholders to the program. Data sources are online surveys, synchronous and asynchronous interviews, and anecdotal data. Preliminary results are discussed.

Introduction

Even when teaching is usually one of the last professions to adopt the changes that happen in society at large, it has moved from being a mainly solo endeavor to become a collegial experience (Wise & Leibbrand, 1996). Colleges of education are now offering degrees that take advantage of technologies that promote exchange of ideas and the building of communities of learners through online settings. In fact, many institutions fear that they will be extinct if they do not offer web-based distance education courses (Roblyer, 1999). Because degree programs delivered through online environments are so new to the education arena, it is necessary to evaluate the program as a whole to understand the dynamics that happen in the virtual classroom. Manning (cited by Osborne & House, 1995) discussed that one of main reasons for conducting an evaluation is to determine what has been accomplished and how it might be accomplished better. Although there are several approaches to conducting program evaluation, a valid and accepted approach is for the institution to set its own evaluators to identify its own strengths and weaknesses (Warren & Curley, 1998). It is believed that when the institution takes the first stake at an evaluation process, faculty are more likely to make the necessary changes to improve the program (Osborne & House, 1995). Program evaluation provides valuable feedback that allows administrators and faculty to examine the effectiveness of the program to then correct, change, improve, add, or delete components of the same. A successful program is one in which the systemic evaluation of the program philosophy, goals, design and outcomes become an integral part of the same and not a reaction to external demands for accountability (Warren & Curley, 1998). Comprehensive evaluations must include all stakeholders: administrators, faculty, students, graduates, and employers.

The Master's of Education in Educational Technology (MED in Ed Tech) at Northern Arizona University has a strong PK-12 emphasis. This 36 credit-hr. degree program is delivered totally online using several interfaces, such as WebCT, Blackboard, and in-house designed Web Tools. Because of the convenience of taking courses without having to travel to far away campuses, this program attracts not only statewide students in Arizona, but students in other states of the country as well as students in different countries. In order to design and implement a comprehensive and effective formative evaluation, two phases are planned. The first phase will collect the perceptions of the closest stakeholders (students enrolled in the program, faculty teaching for the program, and administrators directly involved with the program), while phase two will collect and integrate the perceptions of the farthest stakeholders (university administrators, graduates' employers). This paper discusses the planning, processes, data sources, data collection, and data analysis to evaluate formatively the first phase of the MED in Ed Tech program.

Goals and Objectives

1. Understand the type of students who enroll in the program and their needs. Since this program was conceived as a program serving PK-12 teachers, it is important to know if it is attracting the target population.
2. Look at the processes for program admission and whether they are user friendly and user oriented. Students in this program usually do not meet in person with a faculty for the application process or advisement because the program serves mostly students who are not physically close to the university campus facilities. It is important to measure the clarity and easiness of the application process and whether it is client oriented.
3. Measure the change in self-reported classroom practices and technology adoption that the students experience as a consequence of taking courses in the master's program. The goal of the master's program is to provide teachers with tools and skills to integrate technology into teaching, so it is important to measure this change in daily classroom applications.
4. Gain an understanding of the student as an online learner. It is important to identify the cognitive and metacognitive strategies that students use when interacting with the class material. Also, because most of what happens in an online course is text based, we need to know the student perspective on online course expectations for time, rigor, workload, and accommodations that facilitate or hinder learning in this environment.
5. Investigate the perceptions of efficacy and workload of faculty who teach online courses. Online faculty have many questions regarding what it constitutes a rigorous but time-wise reasonable course. This objective will help identify strategies that faculty use to make an efficient use of time and resources in an online course and whether online courses constitute a burden to faculty's duties.
6. Look at the administrators perceptions of the program in such aspects as revenue, allocation of resources, prestige for the department, and any other administrative issues related to the master's program. Administrators that work closely with faculty in this program will be able to provide perspectives that will inform the scholarship and issues related to budget of the master's program.

Methodology and Plan of Research

Lapan (in press) discusses that the best evaluation studies incorporate data collected through both qualitative and quantitative methods. Data to evaluate the MED in Ed Tech will come from both quantitative and qualitative sources. The quantitative sources include interactive online surveys that are described below.
Personal Information Database. This survey provides information on the background of the students and the current positions they hold in the school setting.
Hardware inventory. This survey gives faculty information about the hardware and software the students have at their disposal to complete the MED in Ed Tech program.
Online Technologies Self-Efficacy Survey (OTSES) (Miltiadou, 1999). The OTSES is a self-report of student beliefs of self-efficacy with specific Internet applications and basic computer skills.
Stages of Concern About Technology. This survey, originally designed and validated by Hall, George, and Rutherford (1977) measures the seven hypothesized stages that an individual moves through when adopting a process of product innovation, i.e., technology.
Motivated Strategies for Learning Questionnaire, (MSLQ) (Pintrich & De Groot, 1990). The MSLQ is a self-report of motivational factors, cognitive and metacognitive strategies that students monitor and regulate when studying or working on course assignments.

Qualitative data will include letters of application to the program, messages to a Virtual Conference Center (a bulletin board), student asynchronous exit interviews, and faculty and administrator synchronous interviews. Data collected through quantitative instruments will be analyzed using parametric and non-parametric statistics, while data collected through qualitative methods will be analyzed using content analysis and analysis of emerging themes.

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Preliminary Findings

Currently data have been collected on fifty students and preliminary results indicate some interesting findings. Initially students have reported relatively high average ratings of self-efficacy for technology skills. However, a little over 10% of the students had individual total SES ratings that ranged between 2.7 and 3.0 (2="Not Very Confident" 3="Somewhat Confident"), indicating they may have difficulty accessing course materials or interacting with their peers in their courses. These students may indeed benefit from advisement on specific technology skills at the beginning of their program. However, the most interesting finding has been in regard to the motivational scales (7 being highest) within MSLQ. Overall students averaged 6.57 (7 being highest) on Intrinsic Goal Orientation items while only a 4.14 on Extrinsic Goal Orientation items was reported. Not surprisingly, students averaged 6.84 on Task Value items (which were worded as computer tasks) and 1.98 on Task Anxiety items suggesting that they valued the tasks, but were not necessarily intimidated by them. Also of interest in the MSLQ, was the overall students' average of the Peer Collaboration items within the strategies section. Here students reported a 4.87, the lowest average of all of the cognitive or metacognitive strategies.

Conclusions

It is expected that through this project, administrators and faculty will be able to identify the strengths and weaknesses of the MED in Ed Tech program. Early identification of weak points in the program will help build and grow an online master's program that has the potential of becoming nationally recognized for its quality and student-centered approach. Analyzed data will be disseminated to the stakeholders in the form of a written report and/or a web site.

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PalmOS Handheld Computers And Standards, Assessment, And Accountability

Penelope Walters Swenson, Advanced Education, California State University Bakersfield, United States of America, pswenson@csub.edu

Abstract: Teachers and administrators are expected to be increasingly accountable. Standards, normed referenced testing, and other forms of accountability are part of the daily routine. How can teachers keep up with the increased demands and little time? Handheld computers can assist the teacher in meeting these requirements and they can lighten other parts of the teaching load too.

Assessment and accountability is one of the prevailing movements in schools across the US, Canada, and many other areas of the world. In the US and Canada, teachers have scant time to perform the standard functions of teaching and record keeping. Now they are being required to maintain testing records, perform additional assessments, provide extra help for students below standard, and develop strategies for meeting standards that they seldom had a voice in establishing. Teachers and principals are changing the way they conduct their business to accommodate the increased demands of the standards and assessment movement. Some are turning to handheld computer technology.

A typical middle school teacher's schedule in a California school is full. Kate Johnson routinely arrives a half-hour to an hour early. She then embarks on her marathon day. Five classes, four preps. Scheduled potty break. Half-hour lunch. Meetings after school twice or three times a week. One to five parent conferences a week. Afternoons, evenings, and even weekends are filled with meetings, school activities, preparation, grading, and school improvement work. What once might have been called dedication is now considered routine by this teacher.

Where does she find the additional time to chart each student's progress toward standards, work with individual needs, and prepare students for the high stakes testing upon which the reputation of her school and her reputation as an excellent teacher depend? The new reality in education is that teachers have great diversity of backgrounds and abilities in their classrooms. They are teaching in a time of an information explosion so their traditional role has changed. Schools are not the source of community pride they once were and funding is not at the levels of four of five decades ago. With less money, there are increasing demands. Many of those demands are related to standards, assessment, and accountability.

Having critical teacher and leadership functions in the "palm of the hand" is helpful. Handheld computing enables teachers and administrators to plan and organize, carry reference information, gather and analyze data, exchange information with other handheld computers, and even collaborate more effectively.

State standards and benchmarks, local standards, and even site benchmarks can be loaded into the handheld computer. Rubrics also can be kept in teacher's personal "data bubble". Individual student tracking, including grades, progress toward meeting standards, and other indicators of progress, can be done using the handheld Scoring of assignments can be done "on the fly" while students are presenting projects or working in groups as the teacher moves about the room. Progress reports can be beamed to a student's handheld, a printer with an infrared port, or sent as a batch for emailing or snail-mailing to parents. Additionally, the teacher or administrator can even use the handheld to create memos, take inventory, or make a list for a lesson plan. All of these can be sent directly to the printer or downloaded.

While handheld computing cannot solve all of the problems of teachers and administrators, there are many functions, assisted by software, that can support and make the data-collection and maintaining tasks easier. Available information and the ability to track standards, assessments, and student progress is critical to school improvement and, more importantly, increased student learning. Handheld computers are part of a solution.

Several universities are involved in research projects using handheld computers. One focuses on pre-service teachers, another on enabling teachers to engage students in handheld computing projects, and another on using handheld computers in supporting teachers and administrators in a data-driven environment.

As a Learning Circle attached to the Project TNT PT3 grant at California State University Bakersfield, we are exploring the uses of handheld computers for teachers and administrators within the high stakes, standards and accountability environment of K-12 public education (Swenson, 2001). Currently, the focus is at the middle school level. Teachers and administrators have been supplied with PalmOS handheld computers and software. They are using these handhelds in their work and reporting on their successes and challenges. The Tools 4 Schools Learning Circle is preparing ways to better equip teachers with data needed to help students achieve greater success.

At the University of Michigan, Elliot Soloway and his team of researchers and teacher participants are developing and field testing software tools for student use. Soloway believes every child should have a handheld computer. He suggests these computers are necessary tools, just like paper and pencils (Soloway, 2001). To this end, Soloway and his team have developed PicoMap concept mapping software, a simulation called Cooties, and PalmSheets worksheets for student use. Designed to inspire teachers and students, these programs are available without cost for school use.

East Carolina University embarked on a project that places PalmOS handheld computers and selected software tools in the hands of students preparing to be teachers. The emphasis is on wireless technologies to support anywhere, anytime learning. Through innovative tutorials, targeted support, and courses where the technologies are incorporated, ECU is changing the way professors teach and students learn (Educause, 2001).

Handheld computing is inexpensive and easily learned. Software applications are being developed rapidly. From personal organization to keeping track of student assessment data and even writing and rewriting papers or articles, the handheld computer is beginning to have an impact in K-12 education.

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Incorporating Cognitive Learning Theory and Instructional Design Models in Graduate-Level Multimedia Development Courses

David Tarcy
Educational Communication and Technology program
New York University
United States
pdt205@nyu.edu

Abstract: This paper is a description of two, graduate-level, multimedia development courses taught at New York University during the fall term of 2001. One course emphasized an instructional design model to guide the development of student projects, the other focused on cognitive learning theory associated with media types, both shared some learning theory content. A qualitative analysis of the projects and experiences of the students accompanies instructor reflection on the varied approaches. The practice of teacher education may be informed by the discussion of course development incorporating the 'living systems' instructional design process and cognitive learning theory. Theory topics included: cognitive load theory, information processing and models of memory, cognitive flexibility theory, dual-coding theory and its descendents.

Introduction

This paper describes two, graduate-level, multimedia development courses taught at New York University during the fall term of 2001. *Instructional Design for the WWW* (ID for the WWW) emphasized the Living Systems instructional design model (Plass & Salisbury, 2001) to guide development of student web-based projects. *Communicating with Computer- Based Interactive Telecommunications* (CBIT) appropriated a three-pronged approach to the study of media types adapted from a similar course taught in the computer science program at George Washington University. Four media types (text, graphics, sound, motion) were evaluated from three distinct perspectives; cognitive learning theory informing the use of the media type, the science or art of the media type, and the technology producing the media type. Students created an instructional project in Flash 5.0 for delivery over the web. Some learning theory content was shared in common by both courses, particularly discussions concerning information-processing models (Mayer, 1997, 1999; Mayer & Anderson, 1991; Paivio, 1971, 1986), limitations of human processing capacities (Miller, 1956), cognitive load (Sweller, 1994; Sweller, Merrienboer, & Paas, 1998), and the influence of multimedia on learning. The courses diverged in their respective emphases. *ID for the WWW* focused on the process of instructional design, *CBIT* more critically analyzed the use of media types and only cursorily discussed the instructional design process. Students in both courses exhibited an eagerness to learn the technology and its practical application in educational settings. This paper explores qualitative differences in their final projects and in their experiences.

The Study

The forty graduate students in the two courses varied widely in their level of prior computer experience and expertise, educational background, program of study, and familiarity with educational and cognitive learning theory. All students produced instructional projects to be delivered over the internet, regardless of prior experience. Students in one course developed projects in Dreamweaver 4, incorporating hand-coding of HTML, JavaScript, and the inclusion of a Flash 5.0 file. Students in the other course developed their instructional projects entirely in Flash 5.0, incorporating the media types discussed during the course. Projects will be vetted for conformity to the stated instructional goal/objectives of the developer, coherence of navigation system, appropriateness and use of media types employed, and self-reported explanations of authoring considerations. Feedback from students concerning their experiences in the courses will be elicited.

Findings

Based on initial reviews of works in progress and on the differing emphases of the courses, students in the *ID for the WWW* course are expected to have more internally coherent navigation schemes within their projects, and will describe the development process with greater clarity than students in the *CBIT* course. The Living Systems ID model guides developers through design steps commonly found in many other models, though it encourages an evaluation of any step at any time in a somewhat recursive manner. The course emphasized the information architecture of the project, the interaction design (defined by instructional methods and navigation options embedded in the project), and use of the media types within the page design.

Students in the *CBIT* course are expected to describe individual instructional design features of their projects with greater detail and theoretical support than their counterparts. The possibility exists that students in the *CBIT* course will intuitively follow the instructional design process (only briefly mentioned in the course) due to the course emphasis on critically analyzing the use of media types. Some transfer of this analysis may occur at the instructional design process level. Evaluation of course topics and sequencing of content will accompany this paper to aid those who are currently developing or instructing multimedia development courses for educators.

Conclusions

Conclusions will be forthcoming as the semester, final projects, and informal interviews are completed.

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Evaluation of an Integrated Constructionist Model for Meaningful Online Learning

Gary R. Tucker, PhD
Northern Arizona University, USA
Flagstaff, AZ Gary.Tucker@nau.edu

Michael Blocher, PhD
Northern Arizona University, USA
Flagstaff, AZ Michael.Blocher@nau.edu

Shadow Armfield
Northern Arizona University, USA
Flagstaff, AZ Shadow.Armfield@nau.edu

Abstract: To facilitate this meaningful learning in an online course the course was designed around a model based on the Constructionist Learning Theory. The Integrated Constructionist Model that was implemented was initially developed in a face-to-face (F2F) environment. In the F2F setting, the model was exceptionally successful. However, online environments are often characterized by what Shaw termed as, "social relations that are fractured and social interactions and communications that are strained." This paper reports on a study that indicates the Social Cultural Environment aspect of the model may reduce its effectiveness in an online environment.

In the Spring of 1999, The Center for Excellence in Education at Northern Arizona University began an online Masters Degree in Educational Technology. One of the required courses for this degree is ETC 567: Education, Technology and Society. As with all online courses, meaningful learning was a primary goal when the course was designed for online delivery. To facilitate this meaningful learning, one aspect of the course was designed around a model based on the Constructionist Learning Theory (Papert, 1990; Kafai and Resnick, 1996). Constructionist theory is based upon the concepts of constructivism but goes beyond in it's emphasis on artifacts, asserting that meaningful learning happens particularly well when learners are engaged in building external sharable artifacts. In designing this online course a model based upon the constructionist theory was implemented.

The artifact is the goal, but it is the engagement in the building that provides the context for learning. The sides of the pyramid are paradigms that provide the learner the techniques of engagement for ascending to the artifact. The model is based upon the work of Gargarian (1996), Akerman (1996) and Shaw (1996). Gargarian's (1996) boundary idea, "Freedom in Restrictions," is the counter-intuitive notion that restrictions provide a learner freedom rather than restraint. Without restrictions, a learner is unable to choose from numerous possible actions and becomes over whelmed and paralyzed. So well defined broad restrictions provide the learner with parameters that result in a sense of freedom to choose a course of action. Akerman (1996) points out that we know from Piaget, Kegan and others (Winnicott, 1971) that the ability to reach deeper understanding also requires moments of separation. People need to get immersed in a creative process, but there also comes times when learners must "step out" and detach themselves from this process. The purpose is for them to become their own observers, narrators, and critics. Then they can "dive back" into the creative process with a new understanding. Both "dive in" and "stepping back" are equally needed to reach deeper understanding. Shaw (1996) points out that social settings are not neutral grounds in which creative activities take place. He emphasizes that the Social Cultural Environment is intimately involved with the process and should not be underestimated. The individual and the social planes are intrinsically linked and when social relations are fractured and social interactions and communications are strained, the social setting is affected and the meaningful learning can be disrupted.

The Integrated Constructionist Model that was implemented into the ETC 567 was developed in a face-to-face (F2F) environment. In the F2F setting, the model was exceptionally successful. However, online environments are often characterized by what Shaw termed as, "social relations that are fractured

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and social interactions and communications that are strained." Does the Social Cultural Environment aspect of the model reduce it's effectiveness in an online environment? For example, most students engaged in online learning environments do so alone at their computer where they engage socially with their peers. However, these interactions are mediated through the electronic communication systems utilized within the learning environment. Furthermore, are online courses or programs more attractive to specific types of students based upon the delivery system? For example, do students taking their first online course perhaps thinking they will be studying alone, prefer less social interaction? If so, what do students think about collaborating in the Social Cultural Environment aspect of the model? Although students applying to the M.Ed. online program have suggested that they utilize peer help seeking and peer collaboration as cognitive learning strategies that they employ, do they prefer them?

When asked to rank their feeling of success with this model, 32% of the students reported a positive experience while 32% reported a negative experience, and the remaining 36% were neutral. The ranking was based on a 1 to 5 Likert scale where 1 was extremely negative and 5 extremely positive. Out of an N of 22, four responded 1. When asked to give specific difficulties with the model 75% of these students directly mentioned difficulties in social interactions. Three of the students responded with a 2, and 66% of these directly mentioned difficulties in social interaction. Seven of the twenty-two students responded with a 3, of these 57% directly mentioned difficulties in social interaction. Six of the students responded with a 4 and only 40 % of these students directly mentioned difficulties in social interaction. The one student who gave the course a five did not mention any social interaction difficulties. From this preliminary data there is an indication that the social cultural aspect of the model does reduce its effectiveness in an online environment when the social interactions of the students do not develop properly. This would indicate for this type of model to be successful online careful attention must be given to the Social Cultural Environment.

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Special Cases: Writing Scenarios for Learning to Teach with Technology

Raven Wallace, Michigan State University, US
Shane Cavanaugh, Michigan State University, US

Teacher education and professional development for teaching with technology have presented many problems for the education community. Teachers need to learn to *use* technology, but they also need to learn to *teach* with technology. They need principled knowledge about teaching with technology, but they also need to be able to use the specific technology that is available to them in their schools. Programs have taught general computing skills like word processing or creating Web pages. Others have taught specific software like Hyperstudio or Inspiration. But for a teacher in a specific school with specific software and hardware available, and a curriculum to attend to, the offerings of such programs miss the mark. Being able to create a Web page or use Inspiration may be useful skills in some respects, but they may be entirely inapplicable to our specific teacher's needs.

This study proposes a different approach to professional development for teaching with technology, one that lets teachers use the specific contexts of their own teaching as the content of their professional development. This is done through scenario writing, in which teachers imagine their own teaching with a new technology, and write it up as a narrative, paying special attention to the affordances of technology. They use general principles of technology use to develop and describe plans for their own teaching. These scenarios are then used in the Master's class as the basis for discussion and anaylsis – they provide a text for the class itself.

The question of this research is this: *Can writing cases which imagine and anticipate future teaching episodes help teachers learn to use new tools in their teaching?*

It is proposed that scenario writing gives teachers strategies for planning for technology use, as well as for interacting with students as they use computers. It is intended to help teachers develop a frame of mind that allows them to approach teaching with computers in a different way, focusing on the substantive issues of subject matter and interactions with students.

The scenario assignment consists of the following parts: a lesson plan describing the purpose of the lesson, the activities planned, a rationale for using technology in the lesson, and expected outcomes; a narrative describing the lesson as imagined; and reflections on the lesson after the narrative has been written. The narrative is expected to focus on subject matter learning with attention to discipline or classroom management only as it relates to particular issues of using technology. It includes evidence of the following: What the teacher sees on the screen; how she interprets it; how she thinks students will interpret it; what questions students are likely to ask; and how she will respond to those questions.

One rationale for the scenario assignment is that, without some method of stepping back from the moment of practice and considering how best to teach with a particular technology, teachers find themselves in the flow of the classroom doing the things they know how to do best. Their responses in the moment may not be what they would have done if they had time to consider, but these initial responses can establish dispositions that are hard to change, even if they are less than optimal. Thus, teachers may find themselves using routines and strategies suited to working with printed materials, small group discussions, or physical manipulatives, but perhaps not as well suited to the virtual world of the computer. The scenario assignment attempts to give teachers a way to "pre-experience" the chaos of the computer-filled classroom; to anticipate management, subject matter, and pedagogical issues that arise; and to consider how best to handle them.

Teachers in the study (n=19) were students in two sections of a Master's level class focused on teaching with technology in the subject areas. Four academic subjects were included in the class – mathematics, science, language arts, and social studies. Teachers were from elementary and middle school classrooms. Most of the teachers were teaching full-time; others were former teachers pursuing a degree full time. Each teacher developed two (fall semester) or three (spring semester) scenarios during the course. Scenarios were analyzed to identify patterns across teachers, and development in individual teachers over time.The teachers were interviewed after completion of the

class to probe their response to the scenario assignments and their ideas about how the course affected their knowledge of teaching with technology.

Preliminary Conclusions

The scenario assignment is very different from retrospective case writing and it had a different impact on these teachers. Several teachers reported using what they had learned from their own scenarios and from the work of other teachers in the class to be more involved with students as they worked on computers and to keep the focus on subject matter. They approached this teaching with new found enthusiasm and confidence even though most of what they had the opportunity to learn in the class came from reapplying their own knowledge and expertise, not from being introduced to new technologies.

The scenarios revealed that practicing teachers may look like novices when technology is introduced: they pay less attention to subject matter and more to management and tools; they focus on their knowledge of techniques (software and hardware); and they downplay their own role in facilitating student learning.

ChalkTalk OnLine

Hilary Wilder, Education Department, College of Saint Elizabeth, USA, hwilder_edm85@post.harvard.edu
Pat Schall, Education Department, College of Saint Elizabeth, USA, pschall@liza.st-elizabeth.edu
Joel Reiser, Education Department, College of Saint Elizabeth, USA, jdrwcaldnj@aol.com

Abstract: ChalkTalk OnLine is the technology component of the Alliance to Support the Preservice and Inservice Retention of Educators (ASPIRE) program at the College of Saint Elizabeth in Morristown, New Jersey. We are using ChalkTalk OnLine to provide mentoring and support for preservice and novice teachers via web-based message boards and other posted support material and references. Experienced teachers as well as experts in school administration and school law have been selected to be mentors to help teachers with the various challenges that may face them during their first few years. In this presentation we will discuss our experience in setting up this program and findings to date.

Background

The Alliance to Support the Preservice and Inservice Retention of Educators (ASPIRE) is a new program at the College of Saint Elizabeth, currently funded under a Teacher Preparation Quality and Capacity Grant from by the New Jersey Department of Higher Education. The ASPIRE program aims to increase preservice and novice teacher retention by providing a series of "embodied" workshops, called Chalk Talks and ChalkTalk OnLine, a mentored on-line support web site for preservice and novice teachers with less than three years of classroom teaching experience.

It has been found that mentoring can help these teachers deal with the many challenges will that face them, improving their effectiveness in the classroom as well as their commitment to stay in teaching (Breeding & Whitworth, 1999). It is important to note that ChalkTalk OnLine is not meant as a replacement for any face-to-face mentoring or other supportive measures that the teacher is part of, but rather, to be used in conjunction with these arrangements. While many teacher mentoring programs are more structured and systematically instituted (Newcombe, 1988; Feiman-Nemser, 1996), ChalkTalk OnLine provides an informal arena for any teacher to get opinions and engage in discourse with others outside of his or her school setting. By providing online mentoring that is accessible from any connected web browser, teachers can get support when face-to-face meetings are not feasible (Johanson et. al., 1999; Kerka, 1998).

The ChalkTalk OnLine Web Site

ChalkTalk OnLine is the technology component of the ChalkTalk project and is available free of charge to any teacher who registers. The ChalkTalk OnLine web site uses the Blackboard® learning management system platform. Once a teacher has registered and received a user id and password, they can access the site, which has a *Discussion Board* section that lets them post questions to the ChalkTalk OnLine mentors. The (paid) mentors we have hired are local teachers and school administrators who are experts in areas such as special education, school law, school management, urban and suburban school needs and conflict resolution in addition to the core curriculum areas of math, science, history and English. We have also selected a few novice teachers as mentors with the expectation that they will offer a unique and similar perspective for new teachers. The mentors receive training in the usage of the web site as well as general mentoring guidelines.

Each mentor manages an assigned discussion forum and responds to questions posted by the teachers. Discussion questions are threaded and open for further response from any registered teacher. A search capability allows teachers to look through all posted discussions for specific topics. In addition, the site has an *Announcements* section which has news of upcoming events and other relevant news; an *Information* section about ChalkTalk OnLine and ChalkTalk Workshops; a *Documents* section of germane resource files; and a *Web Sites* section with links to relevant government, organization and commercial Internet sites. A *Staff Information* section contains information about the ChalkTalk staff at Saint Elizabeth and the online mentors. In conjunction with site monitoring, there is also an ongoing "Give us your feedback" survey so we can modify and improve the site as needed.

Current Status

As of this time, the ChalkTalk OnLine web site has been set up and we will be registering teachers. The initial target population will draw from participants of the ChalkTalk workshops and students from the undergraduate and graduate education program at the College of Saint Elizabeth.

Future Plans

We anticipate that word of mouth and mailings to local schools will increase the community as the program continues. We will also be exploring the expansion of this program to include preservice and inservice teachers in Namibia, where one of the authors has worked, in an effort to foster cross-cultural best teaching practices.

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Learning to Teach for Understanding in a Technology-Mediated Professional Development Environment

Rodney Williams
Educational Studies Program
University of Michigan
United States
rodw@umich.edu

Abstract: This paper describes a design experiment where I examined whether and how three first-year teachers' ideas about teaching complex subject matter changed as they learned about a new approach to teaching during a six-week technology-mediated professional development program. Findings suggest that although teachers developed new insights into their teaching, their ideas did not change in substantive ways. Teachers' responded to the program according to their entering ideas about teaching, subject matter, and student learning. Demands made on them as first-year teachers, and the design and duration of the program also influenced their responses. A subsidiary question investigated how teachers responded to the technology-mediated learning environment. A report of these findings is the focus of this paper. Despite problems encountered as they used technology, teachers suggested that, with modification, a technology-mediated environment held promise as a tool for professional development. Implications for future professional development programs are discussed.

Introduction

Along with other subject areas in K-12 education, social studies and history are the focus of various reform initiatives. Among these initiatives, new standards designed to facilitate improvement in teaching and learning social studies and history figure prominently. The standards call for new approaches to teaching that result in significant learning outcomes for students. However, until recently, little research has focused on how teachers can learn to teach in ways that standards documents and other reform initiatives claim they should (Putnam & Borko, 2000), with almost no research focused on how experienced teachers can learn to teach social studies in new ways (Newmann, 1990).

In an effort to understand this process, the study described here examined teachers' ideas as they learned about using one theme addressed in standards about civic education in their teaching. The theme, core democratic values, or ideals of democracy, is addressed in various social studies standards documents (Michigan Curriculum Framework, 1996; National Board for Professional Teaching Standards, 1998; National Council for the Social Studies, 1997). A professional development program situated both in teachers' classrooms and in an online technology-mediated environment served as the site for this study. This program was a design experiment (Brown, 1992) where an innovation, a new framework for planning and teaching, was introduced into teachers' practice. It was expected that this innovation might facilitate the development of teachers' insights and shared understandings about new approaches to teaching social studies and history, particularly in the context of civic education and ideals of democracy.

The program integrated several approaches to teachers' professional development that research suggests holds promise for helping teachers learn to teach for understanding. One approach, *Teaching for Understanding*, a reform-based conceptual framework for teaching and learning (Wiske, 1998) incorporates several elements that are critical for new standards-based approaches to teaching. A second approach, based on research on learning in general, and on teachers' learning in particular, suggests that learning to teach ought to be situated in teachers' practice (Brown, Collins, & Duguid, 1989; Lave & Wenger, 1991; Putnam & Borko, 2000; Wilson & Berne, 1999). Two approaches to professional development that create occasions and environments in which to situate learning to teach are classroom research about one's own practice, and case-based learning. Case learning based on *Cognitive Flexibility Theory* (Spiro, Coulson, Feltovitch, & Anderson, 1988) is especially promising. Other models of professional development suggest

the importance of collaboration among teachers, usually characterized as a community (Wilson & Berne, 1999; Putnam & Borko, 2000; Little, 1993; Lave & Wenger, 1991). Using this integrated model of professional development, teachers collaboratively planned and studied a new approach to teaching and learning social studies

New communications technologies designed to facilitate teachers' professional development, and technologies that teachers used to study classroom practice, were interwoven in a technology-mediated environment for this study. The program web site contained a variety of information and links, including links to programs mentioned here, as well as social studies resources. Technologies used for communication included *Tapped In* (*Teachers Professional Development Institute*), an online chat environment for teachers which was used for meetings, email, which was used for a variety of purposes, and the telephone, which was used on occasion. *ENT* (*Education with New Technologies*), a web site at Harvard, was used to help teachers learn about the *Teaching for Understanding* framework and to plan their units using an online planning tool, *CCDT* (*Collaborative Curriculum Design Tool*). As part of an effort to understand their entering beliefs about teaching about core democratic values, teachers were asked to examine and respond to two examples about such teaching found on the Web; one a hypermedia case study, the other a detailed lesson plan. They examined and responded to both examples at the end of the program as well. To document their research about students' learning, teachers collected artifacts, including digitally recorded videotape, transcripts, images, and text that were assembled as hypermedia case studies on CD-ROMs. Although they were not required to do so, each teacher also had students use technology to help accomplish unit goals. This environment offered advantages over conventional approaches to professional development that included the ability to record instances of practice for later analysis and sharing, the use of electronic communication and collaboration to accommodate teachers' busy schedules, and mediation of distance constraints and problems of scalability usually involved in school-university collaborations.

The Study

This study was conducted in urban and suburban areas of a large Midwestern state. Three first-year secondary social studies teachers interested in advancing their understanding about how to teach about core democratic values participated on a voluntary basis. Lisa Stuart taught 10th grade *Civics and Economics* at a high school located in an affluent suburb of a large metropolitan area. Kathy Miller taught 9th grade *Global Studies West* at a high school located in another affluent suburb of the same metropolitan area. Brad Nelson taught 8th grade *American History* in a middle school located in a working class community in a mediumsized city. All were recent graduates of the large Midwestern research university where I was then a doctoral student and teacher educator. I designed and facilitated the program and participated as a co-researcher. It was hoped that the program would demonstrate that teachers who are separated from each other and from university programs across distances can, with the aid of new communications and collaboration technologies, learn about a new approach to teaching and collaboratively study their classroom practice.

Research focused on teachers' ideas about how to teach about core democratic values, and their students' learning. Data was gathered during the six-week professional development program. Teachers constructed, implemented, and reflected on units about core democratic values, as outlined in the state standards (Michigan Curriculum Framework, 1996). For several reasons, including limiting the scope of this study and teachers' units, and to provide for clarity in the analysis of these activities, teachers focused their teaching on four ideals of democracy - liberty, justice, equality, and the common good. They used principles of *Teaching for Understanding* (Wiske, 1998) as a conceptual framework for designing, implementing, and assessing the units..

The process was documented with electronically recorded interviews, classroom observations, online discussions, reflective field notes, and hypermedia case studies. Along with discussions about planning and implementing units, teachers also reflected on classroom-based hypermedia case studies constructed with artifacts of their teaching that focused on understanding students' learning. The hypermedia case studies, which feature videotape of teachers' teaching, teachers' interviews with students, and other artifacts of teaching and learning were recorded on CD-ROMs and distributed to program participants. Teachers' research focused on the study of the cases. Some discussion and activities took place in person-to-person meetings, but most occurred in online synchronous and asynchronous settings

designed for collaboration and communication. Exceptions were the initial and final interviews with teachers, and most classroom observations conducted by me.

Data analysis involved the description of emergent themes and patterns from observations, interviews, discussions, and communications, and comparative and contrastive analysis of teachers' ideas about teaching, including analysis of teachers' ideas about their case studies.

Findings

In this section, I first offer a brief overview of the study findings. Then, in more detail, I report findings about how teachers reacted to and evaluated the technology-mediated environment in which the program was situated.

The data suggest that a lack of in-depth understanding about subject matter and how to teach about it was an important reason teachers responded as they did. Both of these factors were related to teachers' lack of an informed focus about student learning, and this resulted in problematic outcomes for their own research. In short, the data suggest that teachers' own entering frameworks for teaching rather than the *Teaching for Understanding* framework informed their responses. The framework, as it was presented and as teachers interacted with it, did not help teachers develop more in-depth understanding of subject matter, how to teach about it, or to develop an informed focus on students' learning. Another reason to emerge from the data that explains teachers' responses was the program itself. As it was designed and enacted, the program did not adequately anticipate or accommodate teachers' novice status, their busy lives in and out of school, or their status as learners who apparently did not know much about either core democratic values or how to teach about them. Despite flaws in the design of the program, however, teachers may have fared better had they had a deeper understanding of the subject matter, the tools used by historians to investigate history, and strategies to help students make sense of the content.

Both specific technologies and ways in which they were used proved to be problematic during the program. All three teachers had experience using technology before the program began. During the year previous to the program, Kathy and Lisa had been students in a course I taught at the university where they were required to make extensive use of technology, including *Tapped In*. Brad had been a monitor in a computer lab at the university and appeared to be a proficient user of technology. All three had passed state certification technology requirements for pre-service teachers. They also understood that the program would be situated in a technology-mediated environment. Despite all of this, technology related problems were ubiquitous throughout the program. Some problems were the result of conditions beyond participants' control such as network and server problems or hardware failures. Other problems, however, resulted from a lack of user proficiency (teachers' and my own) with software programs used in the program, particularly *Tapped In*.

Plans for online meetings changed quickly after it became clear that time constraints, and teachers' busy and somewhat unpredictable schedules prevented them from meeting regularly. After a few problematic initial meetings, teachers suggested that meetings be held one-on-one as-needed, a suggestion I heeded. Besides time constraints, there were difficulties associated with the online virtual conferencing environment where we met, *Tapped In*. Two of the teachers had used *Tapped In* previously but still had difficulties because of software and connectivity issues, as well as usability issues. At times the conversations on *Tapped In* were so discombobulated that it was hard to figure out who was saying what or when they said it. This seems to be the nature of chat environments though. Without firm structures in place that allow users to communicate more effectively, it seems as though participants in discussions are talking at random instead of to each other. Although I attempted to impose a sort of discussion protocol in one meeting, teachers ignored it.

Lisa encountered problems with technology throughout the program. Our second interview was to be conducted online, but Lisa was not able to logon to *Tapped In*. After attempting to resolve the problem, we decided to try to have our conversation using email. This worked for a brief time, but a server problem that delayed the delivery of our messages frustrated this attempt as well. Lisa was unable to attend other online meetings because she had not figured out how to access *Tapped In* through her service provider, AOL™, at home. Lisa also had problems with technology at school. I tried to show her how to access *Tapped In* on her computer at school but the computer was not functional and had not been for several days. When Lisa asked for my help after looking over the program plan and finding it "bit overwhelming,"

I responded by locating and sending her several online resources to help her think about how to integrate core democratic values with economics. She never mentioned these resources, perhaps because she had not been able to access them online either at home or at school. Only at the end of the program was she able to resolve some of her technology problems. In the final interview, referring to the program, she told me, "... if I would've never had any of those technology problems, you know, it would've been much more of a breeze to me." To what degree these problems actually interfered with Lisa's ability to understand the program and meet its goals is not clear, but it is clear that technology was a formidable problem with which she had to contend.

Kathy experienced technology problems of a different sort. She had an older computer at home that lacked sufficient memory to open multiple windows. This proved problematic when we met for an online orientation session where I intended to introduce her to the Teaching for Understanding and the associated planning tool. *Tapped In* software allows users to open a web page so that all conference participants can see and discuss the page. Because of computer memory problems, Kathy told me she was afraid to open too many windows at one time, frustrating this part of my plan. In addition to memory problems on her computer, Kathy also found the online planning tool to be confusing and at one point exclaimed that the session was "frustrating." During the final online meeting with all three teachers, Kathy was disconnected momentarily. This caused her to miss Lisa's response to a question, and when she reconnected she continued responding as if Lisa had said nothing. This was not only disconcerting; it also threw the conversation out of synch for a short while.

Brad did not own a personal computer. Since many program activities were scheduled in the evening, it was necessary for me to obtain a computer from the university to loan Brad for the duration of the program. This is obviously not a practical solution to such a problem for programs with many more participants. For an online interview with Brad, I had prepared questions to paste into the text window on *Tapped In*, hoping to save some time. However, at one point in the interview, because of a glitch of some sort, I pasted in a whole series of questions at once! Brad was overwhelmed and indicated some irritation by asking me to ask one question at a time. He then continued answering a previous question which proved confusing to me since I expected him to answer a different question. Again, this proved to be a frustrating meeting.

It seems that almost every technology problem that could have occurred did occur during this program. A few of these problems included lost network connections, insufficient computer memory, software that didn't work with certain web browsers, server problems that delayed delivery of email, network problems on school computers, computer viruses, software crashes, etc. Teachers were frustrated with these problems, as was I.

Teachers offered valuable suggestions about redesigning the program, including extending the program over a much longer time period (a semester, a year, or two years) so that problems of the sort described here could perhaps be overcome with less frustration. Brad suggested that a much longer program might also promote an environment where teachers could establish a rapport that allowed them to feel more comfortable about talking about their teaching. He also liked the idea of finding someone at a distance to work with since he appeared to feel isolated at his school. Kathy suggested that directions needed to be much more explicit than what had been provided. This was surprising to me since I thought I had provided directions and guidelines that were too detailed. Kathy also suggested that I design planning and assessment tools based on *Teaching for Understanding* and include them on the program site. She said switching sites was confusing, and that the program should be self-contained. Lisa suggested that programs should be tested for compatibility before using them. Both Brad and Lisa suggested that many teachers are still very leery about using technology and requiring them to use it may be counterproductive.

Despite all of the problems we encountered, and much to my surprise, when I asked teachers at the end of the program whether they thought technology was an effective tool for professional development purposes, they resoundingly supported its use. They all felt that new technologies can provide the means for teacher collaboration and learning about new approaches to teaching.

Conclusions

Despite demonstrating possibilities for teachers' professional development, findings from this study suggest that designing and facilitating technology-mediated environments for such purposes is more

problematic than much of the rhetoric on this subject suggests. For instance, I had assumed that these teachers were proficient users and could use program technologies with little difficulty. I based this assumption on my personal experiences with teachers knowing that they had used at least one of the technologies (*Tapped In*) previously. I also assumed they had adequate technology resources of their own that would allow them to participate in the program. However, I was wrong on both counts. It cannot, therefore, be assumed that once teachers have used a particular technology a few times that they will remain proficient in its use over time or that they possess adequate resources to participate in such programs. A thorough assessment of teachers' technology skills and resources before the beginning of such programs needs to be undertaken so that teachers have an opportunity to learn technologies they are not familiar with and obtain resources needed to participate. Findings from this study also suggest that the technologies used in the program were far too complicated and that valuable time was expended on solving problems associated with the technology that could have been used more productively. These conclusions are not meant to discourage the idea of using technology-mediated environments for professional development; rather, they are meant to inform future development of those environments.

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Content-Based Teacher Education

Marisa Wolfe, New Mexico Tech, US

New Mexico Tech, home to the Very Large Array, Energetic Materials Research and Testing Center, Langmuir Laboratory for Atmospheric Research, and other first class, nationally renowned research centers, offers teachers the opportunity to earn an advanced degree working side by side with the scientists of these institutions. The Master of Science Teaching (MST) Program emphasizes, not pedagogy, but hands-on experiences and content-based courses for teachers of all math and science disciplines.

Began in 1969 to address the needs of New Mexican science teachers, the MST Program has thrived and grown to address the needs of teachers in five states and two countries. Courses are delivered through a variety of methods – intensive two-week on-campus sessions, field experiences, laboratory research, independent projects, and distance delivery. On-line chat rooms for each course and a general science-teaching listserv promote discussion and solidarity among students. Two full time program staff members on campus provide advocacy and administrative support for the students.

The hectic nature of a teacher's life requires practical, useful experiences in their continued education. Through required curriculum development, joint research projects, and special programs, the MST Program strives to offer education teachers can immediately transfer to their classrooms. In essence, the students learn from the program as their teacher learns from the professor.

Through participation in this institutional session, conference-goers can learn more about New Mexico Tech's Master of Science Teaching Program. Selected course material, student work, special projects, and program outlines will be on display.

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